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CRAFTS

PRIMITIVE WEAVING

CANADA

226-82

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4-H MOTTO

Learn to do by doing

4-H PLEDGE

I pledge
My HEAD to clearer thinking,
My HEART to greater loyalty,
My HANDS to larger service,
My HEALTH to better living,
For my club, my community and my country

4-H GRACE

(Tune of Auld Lang Syne)

We thank thee, Lord, for blessings great
On this, our own fair land.
Teach us to serve thee joyfully,
With head, heart, health and hand.

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INTRODUCTION

Hi! Welcome to the 4-H Primitive Weaving project.

This year, as you progress through the lessons and projects, you learn different weaving techniques and designs. You also learn about the elements of design.

In this unit, you complete the following projects:

- your Project Book
- a placemat
- an Ojo de Dios (Eye of God) wall hanging
- a finger woven article
- a bookmark
- an Achievement Day project
- any extra projects you choose

ACHIEVEMENT DAY DISPLAY

Achievement Day gives you a chance to show your family, friends and community members what you learned in Primitive Weaving. On Achievement Day, you display all the projects you completed this year, as well as your Project Book.

Try to make your display as attractive as possible. Keep in mind all the elements of design you learn.

THE CLUB LIBRARY

Your club, as a group, collects materials for its' library. The library probably consists of file folders containing clippings and booklets. You can contribute to the library by clipping articles from magazines and finding booklets about primitive weaving and design. Keep your eyes open for any new ideas and designs. The library is something else that your club displays on Achievement Day, so do what you can to add interesting new materials to it.

YOUR PROJECT BOOK

Throughout the year, you learn about the different elements of design. Keep all your design projects together in your Project Book.

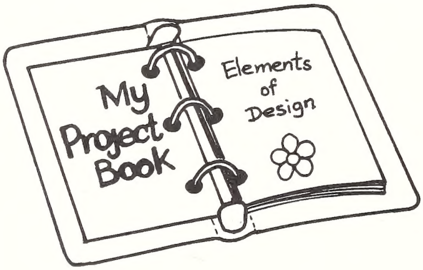
In addition to the design projects you work on, you should collect design ideas from other books and magazines. You can cut these ideas out and paste them into your Project Book, or if you like, you can draw or trace them into your book. Take care not to ruin books or magazines that someone may still want to use.

Start collecting ideas for weaving projects right away. Watch for projects for off-loom weaving such as paper weaving, braiding, and spool weaving and weaving into fabric.

Watch also for projects that are made on a loom. Try to come up with examples of as many types of looms as you can and make a list in your Project Book.

There are lots of super weaving ideas in this book. If you like some of the ideas, trace them into your Project Book as design examples.

You can starting working on your Project Book right now!



EVALUATION SHEET FOR PRIMITIVE WEAVING PROJECT

Description of Project: ______________________________

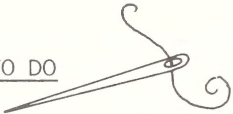
Rate your completed primitive project by placing a check (✓) in the column that you feel your project deserves.

	Excellent	Very Good	Good	Fair	Poor
FUNCTION 1. The type of material and fibre is suited to the end use of the project.					
2. The article appears to serve its end use.					
3. The article is finished and ready to use.					
DESIGN 1. The color scheme is effective.					
2. The design shows imagination and originality.					
3. The design has a pleasing arrangement.					
4. The use of different textures is effective.					
CRAFTMANSHIP 1. All loose threads are trimmed off.					
2. The weaving lies flat.					
3. The article is neat, clean and finished.					
4. The tension of the weaving is correct, neither too tight nor too loose.					
5. The tension is even throughout.					

LESSON 1

IDEAS TO BE LEARNED

1. What primitive weaving is
2. A short history of weaving
3. Materials and equipment needed for weaving projects



THINGS TO DO

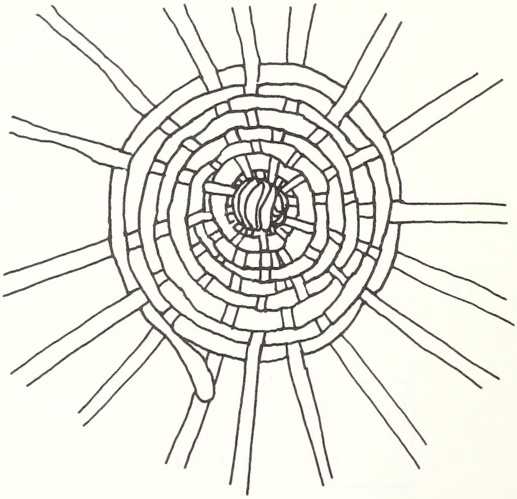
1. Get together in your group and look closely at the clothes you and your group members are wearing.

   When you look at fabric closely, you see that it is made up of threads that crisscross each other. The crossing or intertwining of threads is called weaving.

2. Try to determine what kinds of fabrics your group's clothes are made from. Is the cloth woolen or cotton? Is it nylon or some other man-made material?

WHAT IS PRIMITIVE WEAVING?

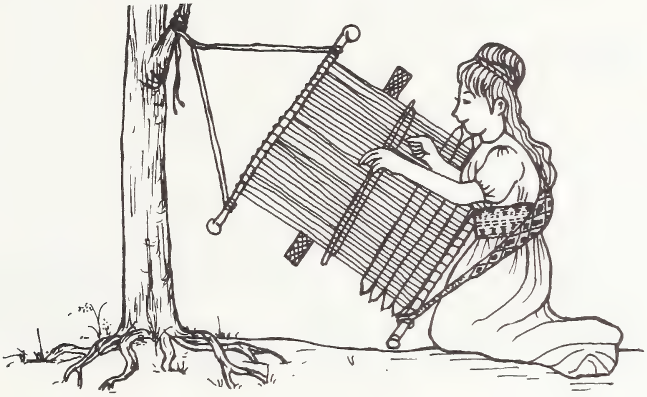
Primitive weaving is the twining together of threads or fibres using your fingers or hands as tools. Sometimes a simple hand loom or frame is used to hold vertical threads in place while you weave other threads across. We call it "primitive" because weaving was done this way long before powered equipment was invented. Using primitive weaving techniques, you can make lots of pretty and practical things like placemats, wall hangings, and purses.



A SHORT HISTORY OF WEAVING

Weaving is a craft that can be traced back to very early times. Nobody is quite sure who invented weaving, but we know it is one of the most ancient household arts. Four thousand years ago in Egypt, people wove clothing, ornaments, baskets, cradles and many other household items.

Men and women first wove threads together using the only tools available to them--their fingers. They tied several stems of long grass or vines together, anchored the knot over a tree branch, and braided the stems together to make a rope. Primitive people knew that twining several fibres together created more strength than separate fibres.



As the early men and women developed their skills, they wanted to speed up the weaving process. Gradually, simple hand looms were developed. These looms consisted of a frame strung with threads. Other threads were then woven in and out of these vertical threads. Rods were inserted under the crisscrossed fibres and used to raise the threads up and pack them tightly to make a solid piece of cloth.

The Navajo Indians used this technique to make blankets and clothing. Sometimes museums have displays of woven cloth that are hundreds of years old. It is amazing to see how well the cloth has lasted. Perhaps "primitive" weaving was more advanced than some of our modern techniques.

Step by step, hand looms became more and more intricate. A device called the harness was invented to raise and lower threads automatically.

Many of our great-great-grandmothers wove their own cloth. They would clip wool from their sheep, clean it and spin it on spinning wheels to make long strands of yarn. They would then use the yarn to weave woolen cloth that they cut and sewed into sturdy warm clothes for their families.

About 200 years ago, power looms were invented. These looms could make yards and yards of smooth, perfect cloth very quickly.

But some people did not want to give up hand weaving. They knew that there was something very special about creating a one-of-a-kind item using skill and imagination. People today continue to use primitive weaving techniques to make useful and decorative things.

MATERIALS

Materials used for weaving can be classified into two areas; natural and man-made.

Natural Materials

Natural materials include a wide range of animal, plant and mineral fibres. Often these fibres are spun into yarn. The spinning process combines the short fibres together into a long filament. This process gives the fibres strength. The spun yarn can be made in a range of thicknesses from fine thread to heavy rope. To add further strength to the yarn, two or more strands are twisted together. This process is called plying. Most yarn labels state that ply-two-ply means two yarns are twisted together, three-ply means three yarns are twisted together and so forth. The thickness of the finished material depends on both the thickness of the fibre making up the yarn and the number of yarns plied together.

Wool

Wool is an animal fibre which is commonly spun into yarn and made into clothing, fabrics and crafts. Wool yarn can be used to make a variety of designs. Wool can be bought in different weights and plies. Make sure to buy the type that is most suited for the project you are making. For example, thin one-ply wool does not make a strong, rigid-looking project.

Silk

Silk is another animal fibre. Silk yarn is quite thin, but very strong, elastic and resilient. Silk thread is difficult to find and is quite expensive. You probably will not be using silk thread for your woven hem now. However, look through magazines and books to see how silk thread can be used to create lovely effects in woven designs.

Cotton

Cotton is a plant fibre. It is not as elastic as wool, but is strong, flexible, and resists abrasion. Most of our cotton thread today is treated in a process known as mercerization to give it extra strength and added lustre. You can buy cotton as a thread, which can be used decoratively in basketry. Cotton can also be bought as a tightly plied twine from hardware stores or a more flexible twine, such as that used for tying parcels. Other assorted types of cotton can be found in stationery and hardware stores in various sizes, plies and types. Take a look around stores in your area to see the type of cotton yarns you can get.

Linen

Linen is also a plant fibre. It is thicker and stronger than cotton, but is not as elastic. Linen is available from most craft shops in three forms: line linen, made from the longest and best flax fibres; tow linen, made from the ends and shorter fibres; and waxed linen, linen thread that has been coated with wax. Linen comes in a variety of weights, thicknesses and colors. It is less costly than silk, but more expensive than cotton.

Jute

Jute is another plant fibre. Most of our jute comes from India. Jute is smooth, lustrous and flexible but not as strong as linen. Jute is easily weakened by sunlight and moisture, and therefore should not be made into baskets used outdoors. Jute is low cost and can be found in many different size ranges and weights. You can usually buy jute at craft shops, hardware stores and some stationery shops.

Sisal

Sisal fibres are made from leaves of a plant grown mainly in Africa and Mexico. These fibres are harder, larger and stiffer than jute. Sisal is a good material to use for plant hangers and outdoor baskets. Sisal is found mainly in the form of twine, cord, and rope. A common twine made of sisal is that used for baling twine. Sisal fibres can be hard on your hands, so if you decide to work with it buy a pair of flexible utility or rubber gloves.

Rattan

Rattan is a plant fibre found in certain types of palm trees. Rattan fibres contribute two materials to basketry; reed and cane. Reed is a flexible material used to make baskets. Cane is a shiny, half round stripping commonly used in chair seats. You will not be working with rattan in your Primitive Weaving projects.

Raffia

Raffia is taken from the underside leaf of a type of palm tree. Raffia is strong, flexible, and resistant to abrasion. Raffia comes in many colors and can be bought usually in craft and yarn shops. You can also buy a synthetic raffia. It is very shiny and crisp. Both types of raffia can be used in primitive weaving.

Mineral Fibres

Mineral fibres include gold, silver, copper, and steel. They are available in forms of wires, strips, and cables. Mineral fibres are used in some forms of primitive weaving. Thin wires can be decorative and heavy wires can be used for support. They are relatively inflexible making them hard to work with. See if you can find pictures of weavings which have used metal fibres. How are they used?

Man-made Materials

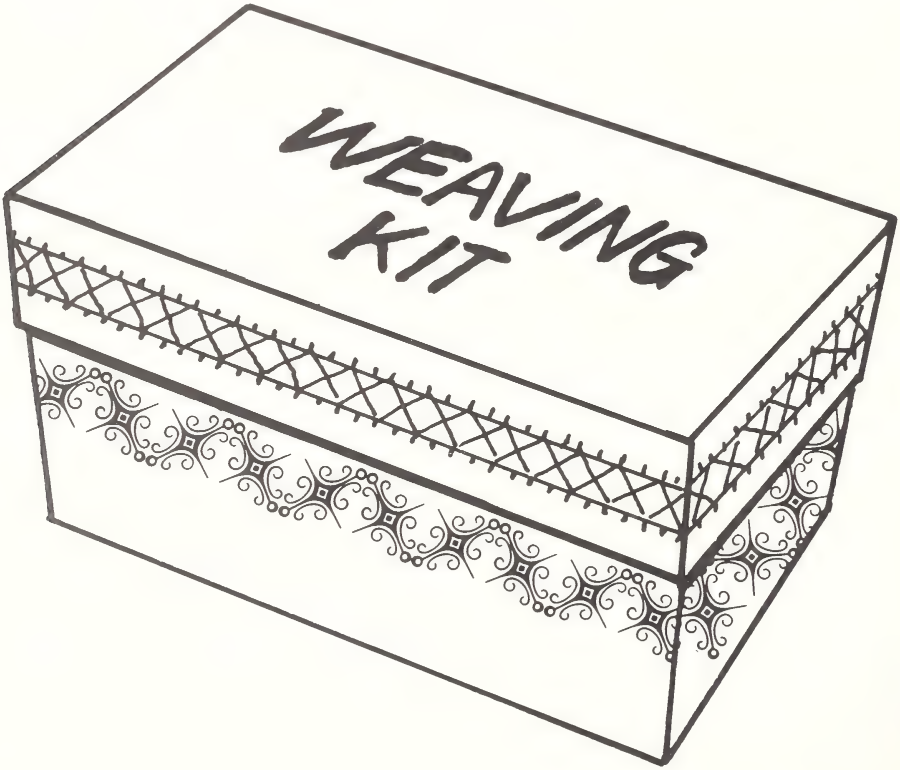
A wide variety of synthetic fibres are available since man has learned how to spin fibres from chemical compounds. Synthetic materials used in primitive weaving include synthetic yarn, synthetic raffia, braided nylon cords, polypropylene twine and thin plastic tubing. Look around your house. You probably can find other man-made materials which can be used in your weaving.

EQUIPMENT

Here is a guideline to the kinds of equipment you need in order to learn the art of primitive weaving. Each project requires additional materials, outlined when it is time to do that project.

Weaving Kit

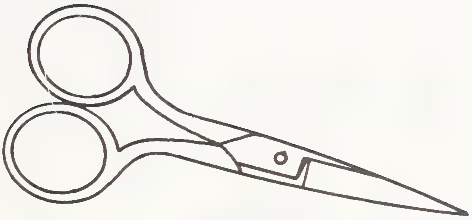
Start out by obtaining a container in which to keep all your equipment together. This helps keep things tidy and helps prevent equipment from getting lost. Your container can be a shoe box, a small gift box, or a purchased sewing basket.



Scissors

Scissors are essential for primitive weaving projects.

You need one pair of all-purpose scissors about nine to 13 centimetres long. You use these scissors for cutting yarn, trimming knots, cutting and notching cardboard, and lots of other things.



Ruler

A long ruler comes in handy for many things--from drawing straight edges to marking out even spacing on a simple cardboard loom.

You need a long ruler, about 40 centimetres in length. Be sure it is marked off in millimetres and centimetres.

Glue

You need a good all-purpose white glue for some of your projects.

Look in your local fabric department or craft shop.

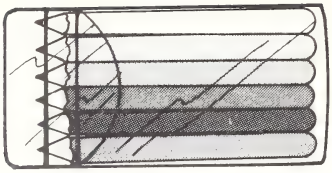
Pencil and Paper

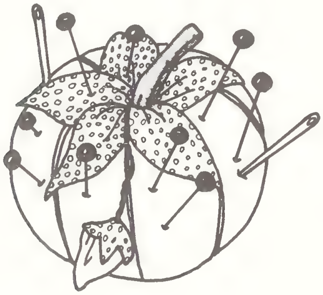
Put an ordinary HB pencil in your kit. It comes in very handy.

You also need several sheets of plain white paper about 21 centimetres by 28 centimetres to plan designs. You can use the paper to trace design ideas and copy patterns as well.

Crayons

You need a package of pencil crayons to plan color schemes for your projects.





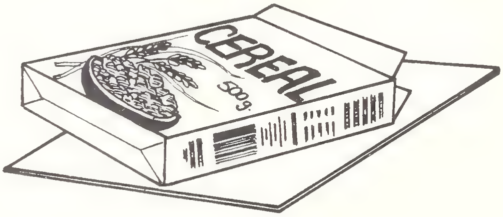
Pins, Needles, and Pin Cushion

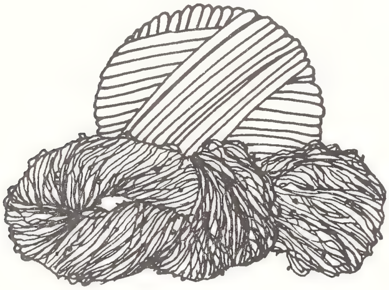
You need a small number of straight pins, and either a small storage container or a pin cushion in which you can store the pins.

You also need a needle with a large eye, such as a tapestry or upholstery needle.

Cardboard

Start collecting sheets of heavy cardboard from cereal boxes, writing pads and cardboard boxes. You need cardboard to make frames and shuttles for some of your projects.





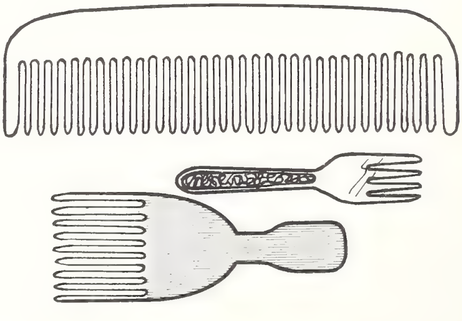
Yarn and Threads

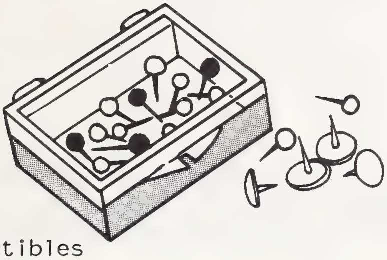
Start collecting as many different kinds of yarn as you can find. You use yarn in most of your weaving projects so try to find yarns with colors that appeal to you. Try to find yarn with interesting textures such as angora and mohair, heavy rug yarn, and unspun wool.

Beater

A beater is a tool used to pack threads tightly together in a weaving. Combs, hair lifters, forks, or wooden beaters from craft shops may be used.

Be sure the teeth are far enough apart that yarn is able to fit between the teeth.





Pushpins

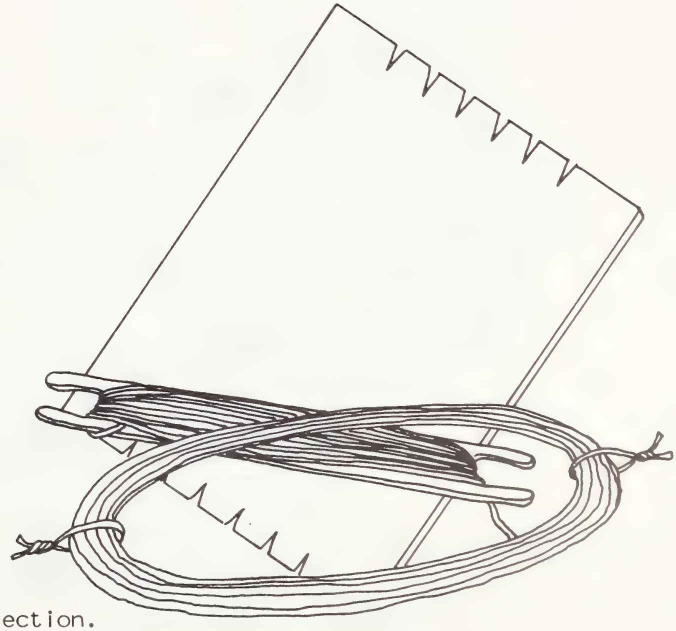
You need a box of pushpins or bulletin board pins. These are pins that have broad plastic heads.

Collectibles

Start collecting interesting bits and pieces such as pine cones, beads, feathers, buttons, and wild grasses to add interest to your weaving projects. Keep them in a plastic bag in your kit so that you can always find them.

MORE THINGS TO DO

Here is a list of supplies you need for your weaving kit. See if you can unscramble them.



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eugl ______________

urelr ______________

aetbre ______________

sinp ______________

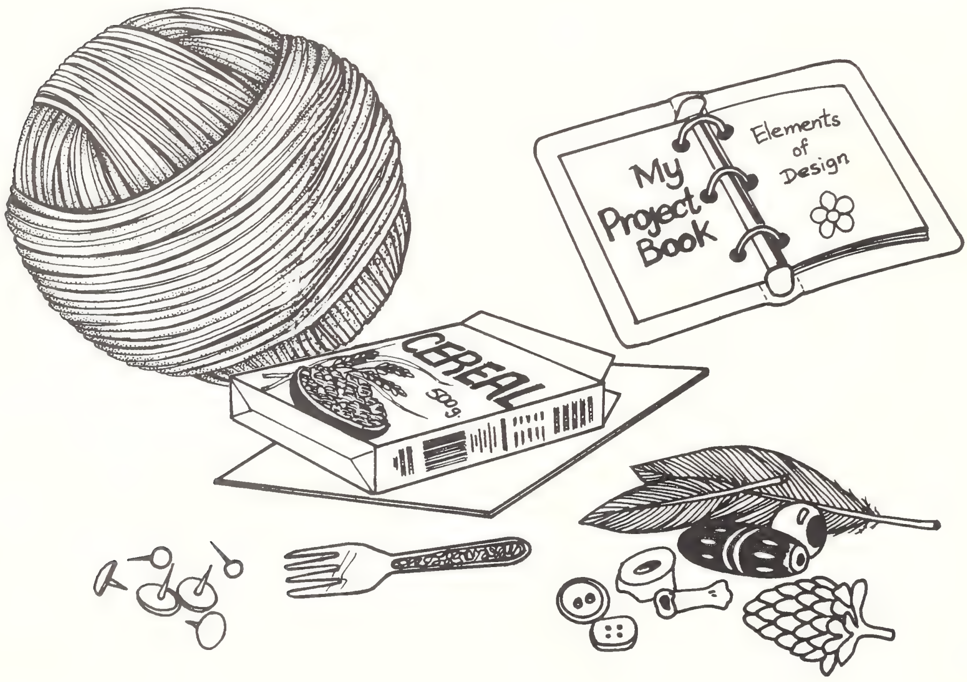
dbrrocada ______________

nyacosr ______________

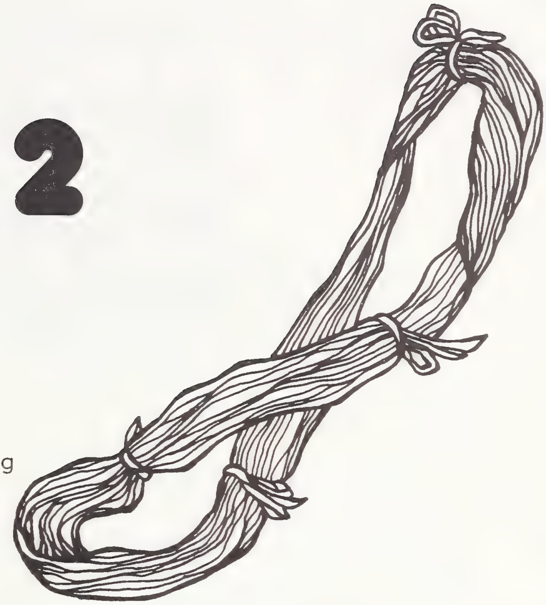
Check your answers in the Answer Section.

MATERIALS TO BRING FOR THE NEXT MEETING

- weaving kit:
  - scissors
  - ruler
  - glue
  - pencil and paper
  - crayons
  - pins, needles, and pin cushion
  - cardboard
  - yarn and threads
  - beater
  - push pins
  - collectibles
- Project Book
- two sheets of construction paper at least 22 centimetres by 20 centimetres, in contrasting colours
- a piece of plastic or heavy paper (such as shelf liner, Mac Tac, or heavy colored cardboard) in a solid color, 40 centimetres by 30 centimetres
- a piece of plastic or heavy paper, in a contrasting pattern or color, 28.5 centimetres by 35.5 centimetres



LESSON 2



IDEAS TO BE LEARNED

1. Elements of design--line and shape
2. What the terms *warp* and *weft* mean
3. How to do simple off-loom paper weaving

ELEMENTS OF DESIGN

Throughout this unit on primitive weaving, you learn about the elements of design. All first-year craft club members receive a booklet called *Design I*.

Whenever you see this symbol, turn to your *Design I* book.

After you finish reading the assigned pages in *Design I*, work on the activities in the Things To Do section. These activities help you learn more about the design elements.

Now, turn to *Design I* and read about line and shape.

In weaving, *line* refers to the vertical (up and down) threads and the horizontal (side to side) threads.

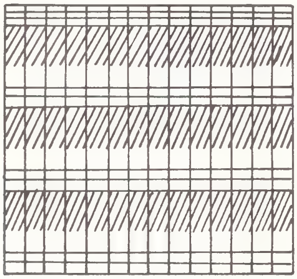
The way in which the vertical and horizontal threads criss-cross creates *shapes* or patterns.

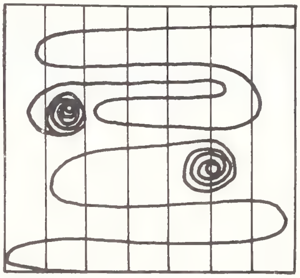
We call the vertical threads the *warp*. The warp threads are the main threads through which the horizontal or *weft* threads are woven.

Together, warp and weft work to:

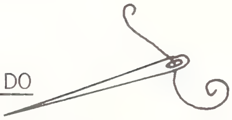
1. create shapes
2. create a pattern
3. create movement
4. divide space

Warp and weft weaving lines can be thick or thin, wide or narrow, straight or curved. Combining different kinds of lines can make a design more interesting.





THINGS TO DO



Make this heading in your Project Book: ELEMENTS OF DESIGN
Line and Shape

Under this heading, draw examples of the following kinds of lines. Use Design I as a guide, but try to be as original as possible.

1. Draw vertical and horizontal lines
2. Show how line creates movement
3. Draw straight and curved lines
4. Use a series of curved lines to make a pattern
5. Use a series of straight lines to make a pattern
6. Show how lines can be used to divide a rectangle
7. Draw lines that indicate a jagged edge
8. Draw lines that show happiness, sadness, anger

PAPER WEAVING SAMPLE

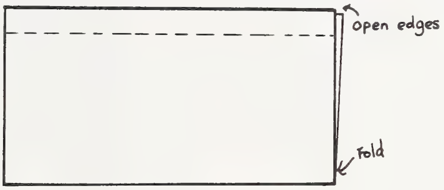
To get a practical idea about how line creates a weaving design, start by making a sample paper weaving. This project also makes you more familiar with the terms warp and weft.

Materials You Need:

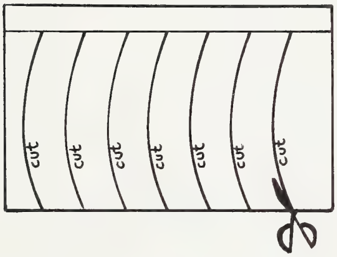
--your weaving kit
--two sheets of construction paper or wrapping paper of contrasting colors (both sheets should measure at least 22 centimetres by 28 centimetres)

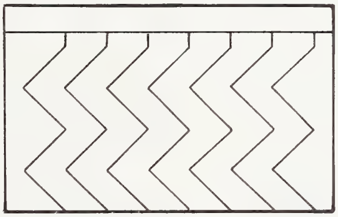
1. Take one sheet of paper and carefully fold it in half.

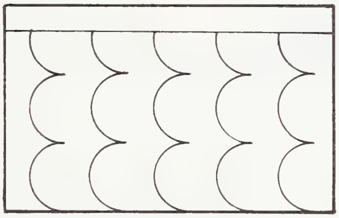
2. Draw a border across the paper 2.5 centimetres from the open edges.



3. There are a number of ways to cut warp strips from paper. Remember what you learned about line and shape and their importance in design. Think about what you want your finished project to look like and start cutting strips from the folded edge up to the border. Do not cut into the border.

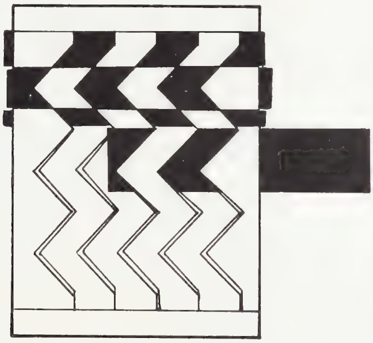


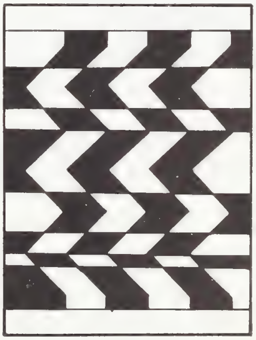




4. Cut strips of weft from the sheet of contrasting paper. You can cut the weft strips in equal or unequal widths.

5. Weave the weft strips over and under the warp strips. Alternate the weft strips so that one strip goes over the warp and the next strip goes under the warp. This weaving is called a "tabby" pattern and helps hold the weaving together.





6. Cut your border into interesting shapes if you wish.

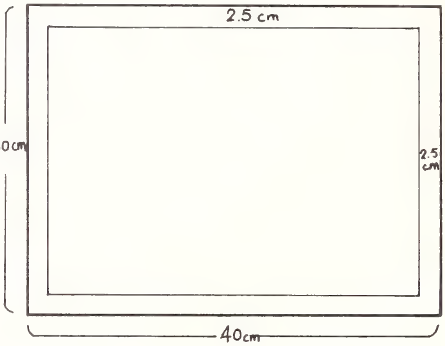
MORE THINGS TO DO

Practise these weaving skills by making a placemat.

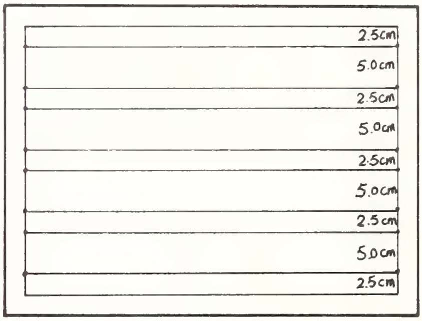
Materials You Need:

- -your weaving kit
- -a piece of plastic or heavy paper in a solid color, 30 centimetres by 40 centimetres
- -a piece of plastic or heavy paper, patterned, 28.5 centimetres by 35.5 centimetres

1. With your ruler, measure and draw a 2.5-centimetre border on all sides on the wrong side of the solid colored paper.

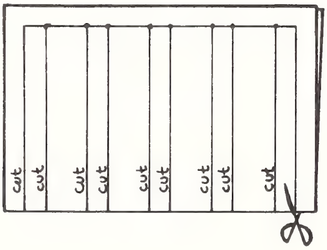


2. Along the two side borders, measure and mark distances of 2.5 centimetres, 5 centimetres, 5 centimetres, 2.5 centimetres, and 5 centimetres. Join the marks.



3. Fold the solid colored sheet in half so that the two 30-centimetre sides are even.

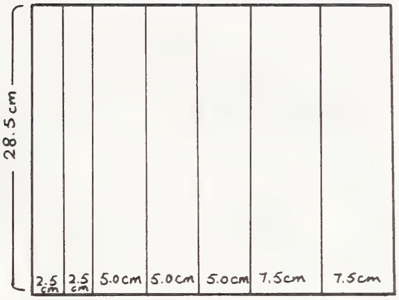
4. Starting from the folded edge, cut along the lines until you reach the 2.5-centimetre border you made earlier. Be careful not to go past the border.



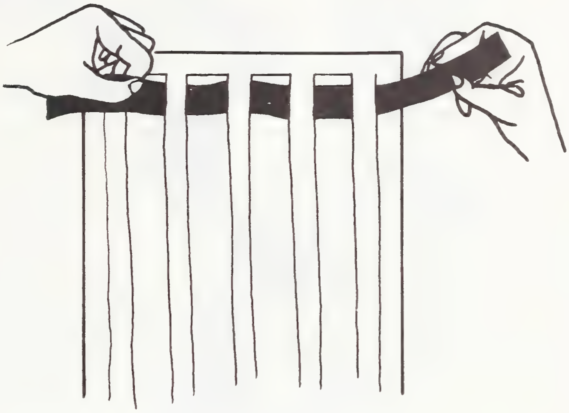
The warp of your placemat is now finished. Next you make the weft.

5. For the weft, measure and cut strips out of the patterned paper. Use your ruler to draw lines along the short side of the paper. You need:
   two strips, 2.5 centimetres wide
   three strips, 5 centimetres wide
   two strips, 7.5 centimetres wide

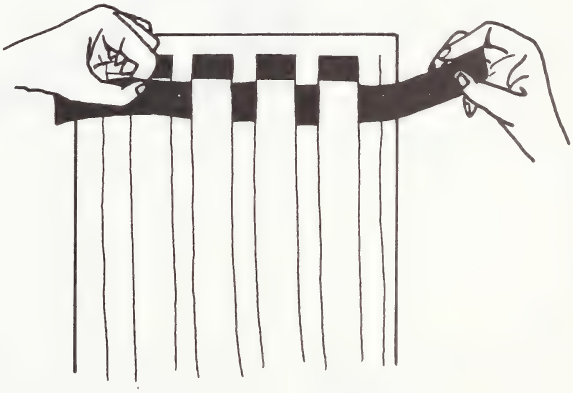
   Cut the strips out neatly.



6. Lay the placemat right side up on a flat surface with the short side nearest you. Beginning at the upper right corner, weave a 2.5-centimetre patterned strip horizontally across the placemat. Weave the strip under the first solid color warp, over the second, under the third, and so on.



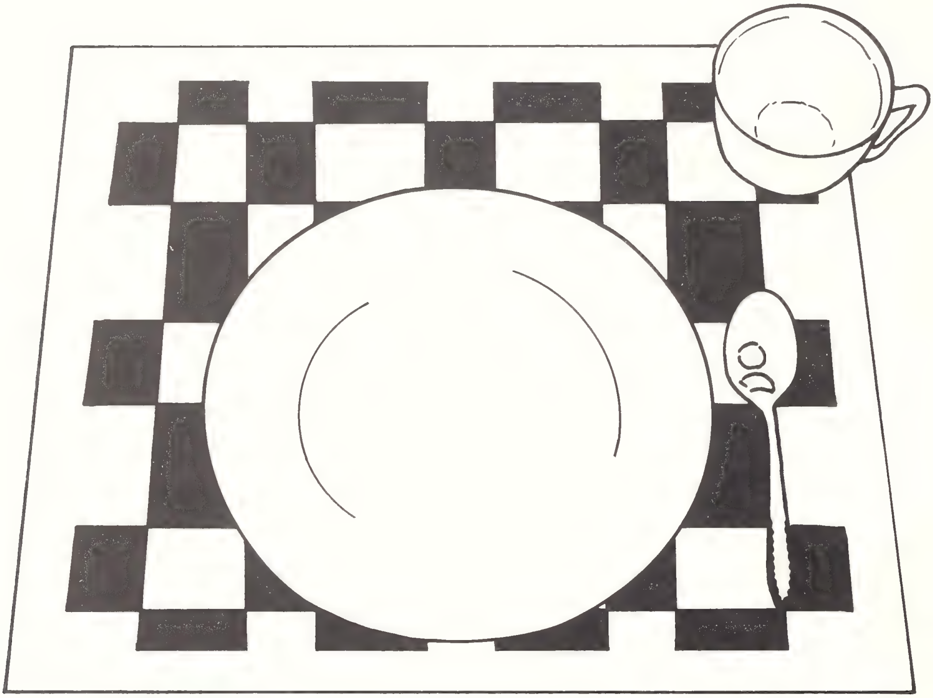
7. Next, weave a five-centimetre patterned strip horizontally below the first patterned strip. Weave over where the first strip went under the warp and weave under the first strip went over. Make sure that the edge of the second patterned strip touches the edge of the first patterned strip.



8. Weave a 7.5-centimetre strip in the same way.

9. Continue weaving in the same way, using the rest of the strips in the following order:
   5 centimetres
   7.5 centimetres
   5 centimetres
   2.5 centimetres

10. Where the weft sticks out past the borders, cut ends so they are all the same. Glue the strips on the top of the borders to the top of the placemat. Turn the mat over and glue the remaining lined-up ends to the back of the placemat.



MATERIALS TO BRING FOR THE NEXT MEETING

- weaving kit
- one dowel rod or one coat hanger (optional)
- yarns of various kinds and colors--keep adding to the collection already in your weaving kit

LESSON 3

IDEAS TO BE LEARNED

1. Element of design--color
2. How to choose an effective color scheme
3. How to do a half hitch
4. How to make an Ojo de Dios (Eye of God)

ELEMENTS OF DESIGN

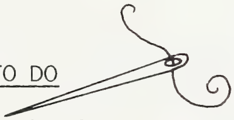
Turn to Design I and read about color. Then, work on the projects below.

COLOR IN PRIMITIVE WEAVING DESIGN

Color is a very important part of primitive weaving design. You have read how color can influence our feelings and our view of size and distance.

Before you start a project, it is a good idea to plan it on paper and experiment with different color schemes. Look at the sketch of your design from a distance to see if it has the effect you want to create.

THINGS TO DO



Color in the following blanks.

1. The three basic primary colors are ☐ ☐ ☐

2. RED + YELLOW = ☐

3. YELLOW + BLUE = ☐

4. ☐ + ☐ = PURPLE

Name the Color Schemes
Example

DARK BLUE   LIGHT BLUE   Monochromatic

a) RED   RED/ORANGE   ORANGE   ____________________

b) GREY   RED   BLACK   ____________________

c) ORANGE   BLUE   ____________________

d) RED/PURPLE   YELLOW   BLUE/PURPLE   ____________________

e) RED   GREEN   BLUE   ORANGE   ____________________

f) PURPLE   GREEN   ORANGE   ____________________

Check your answers in the Answer Section.

TWO WRAPPING STITCHES

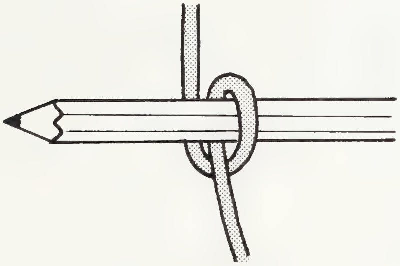
Materials You Need:

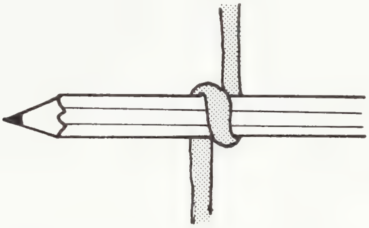
--a small stick (a pencil is good)
--scraps of yarn

Half Hitch

1. Choose a piece of yarn from your kit.
2. Pick the piece of yarn up about 10 centimetres from the end.
3. Leaving the short end dangling, pass the longer end of the yarn over the stick. Then take the yarn under the stick and up.
4. Pull the yarn to the right and tighten the loop around the arm.

That's the half hitch. Simple isn't it? Practice the the half hitch a few times until you are sure you know how to do it.

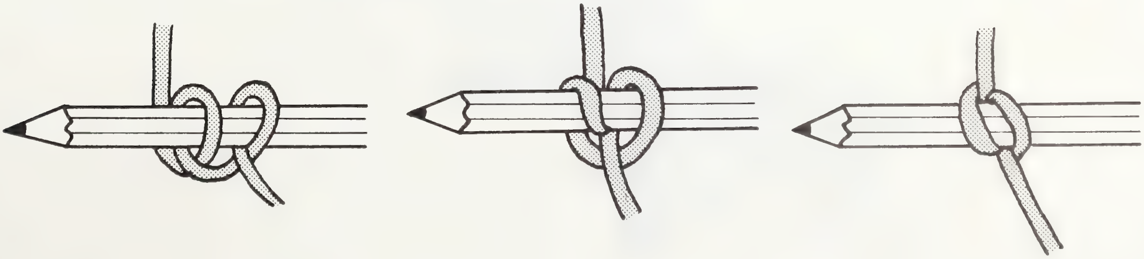




Double Half Hitch

1. Start by making one half hitch.
2. Then, knot a second half hitch right beside the first one.
3. Pull tight.

Practice the double half hitch a few times too.



OJOS DE DIOS

The Ojos de Dios (pronounced o-ho day dee-os) have been found in various parts of the world, but are most commonly seen in South America. The Ojos de Dios or God's Eyes were made to symbolize the eye of a god. They were made by the natives as a request for help or care from the gods.

Today God's Eyes are made by weavers because they are colorful decorations and because they are easy and fun to make.

Large Ojos de Dios make nice wall hangings, smaller ones make colorful mobiles or Christmas tree decorations.

Materials You Need:

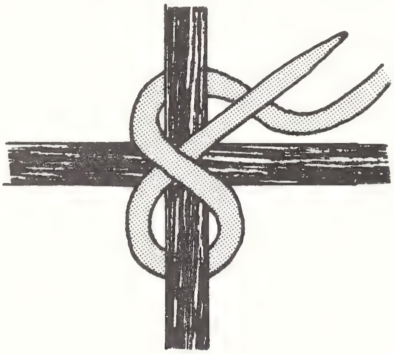
--yarn: for your first God's Eye, start with scraps of medium-sized smooth yarn such as a worsted wool. You need one-metre lengths. With experience you may want to experiment with yarns of different thicknesses and textures.

--two wooden sticks: these can be popsicle sticks, toothpicks, small tree branches or small lengths of doweling from your local hardware store. The size of your God's Eye depends on the size and length of your sticks. For your first God's Eye, you should choose small sticks no longer than a new pencil. Both sticks should be the same length. Notch the sticks in the center so they don't move around while you are working.

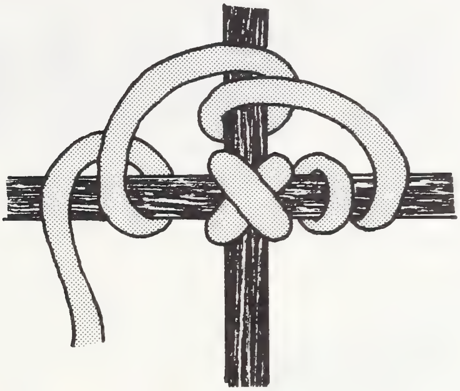
--glue

1. Glue the sticks together in the center to form a cross.

2. Start the God's Eye by making a figure-of-eight around the two sticks. The short tail of yarn will be covered as you wind the wool around the sticks.



3. Take the long end of the yarn to the next arm of the cross and tie a half hitch around it.

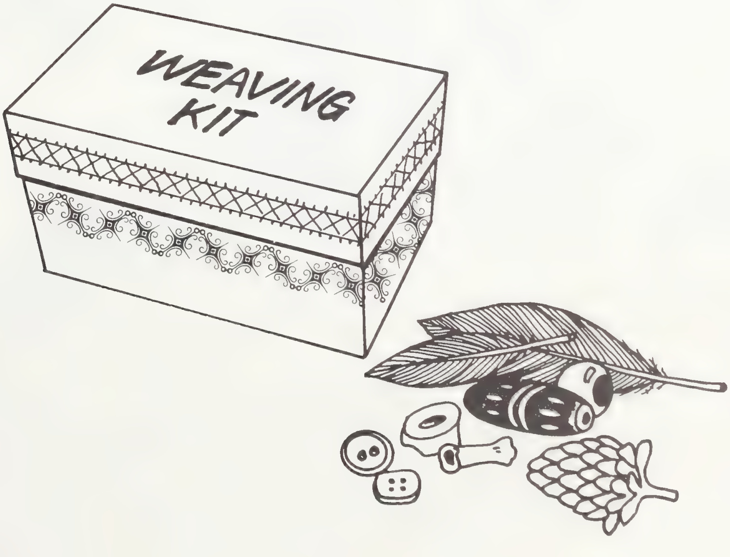


4. Continue wrapping until you come to the end of your yarn. Finish the yarn off by tying a double half hitch. Cut the yarn close to the arm and secure it to the stick with a small dab of glue.

5. Start up a new color by making a double half hitch on the next arm. Once again, the tail of the yarn will be covered as you continue to wrap.

6. Continue tying half hitches and changing yarn colors until you have come to two centimetres from the ends of the sticks. Tie a double half hitch and secure the yarn with a dab of glue as you did in step 4.

7. You can leave your God's Eye as is, or you can decorate it with additional ornaments such as feathers, bows, buttons, or sea shells. Use your imagination.



THINGS TO DO AT HOME

Look for interesting color combinations in pieces of scrap yarn that you have at home. Cut small pieces of yarn and paste them into your Project Book. Label what kinds of color schemes they form.

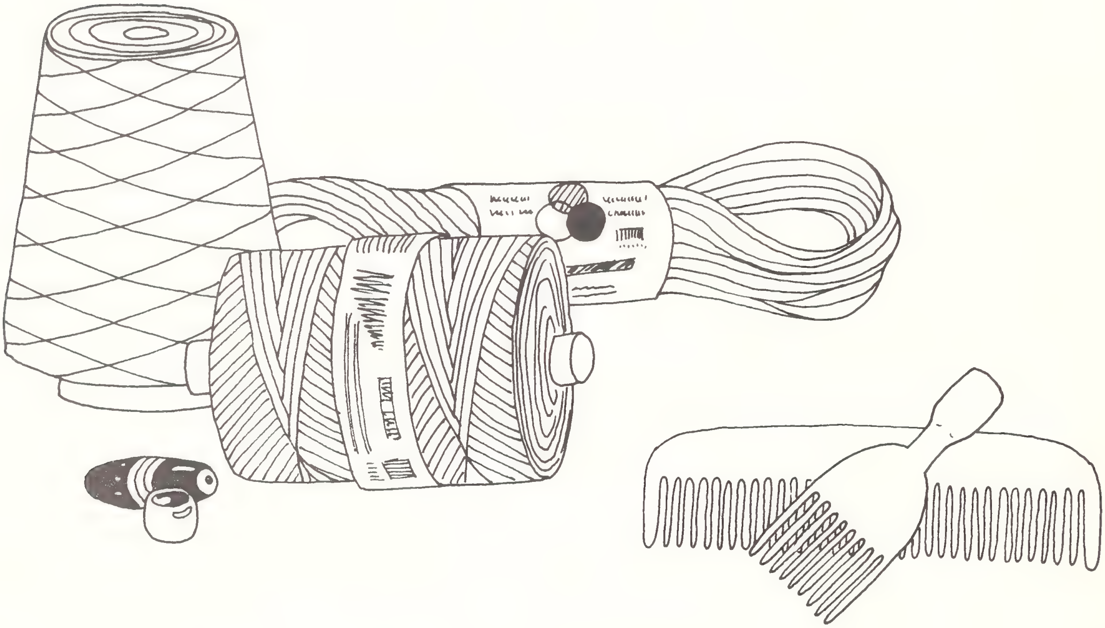
For example:

a. Pair a dark blue piece of rug yarn with a light blue piece of cotton yarn as an example of a monochromatic color scheme.

b. A piece of yellow yarn with a piece of purple yarn illustrates a simple complement of colors.

MATERIALS TO BRING FOR THE NEXT MEETING

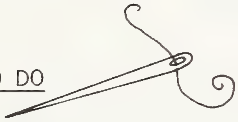
- weaving kit
- a pencil (new or quite long)
- rug wool, synthetic wool, or cotton yarn in various colors



LESSON 4

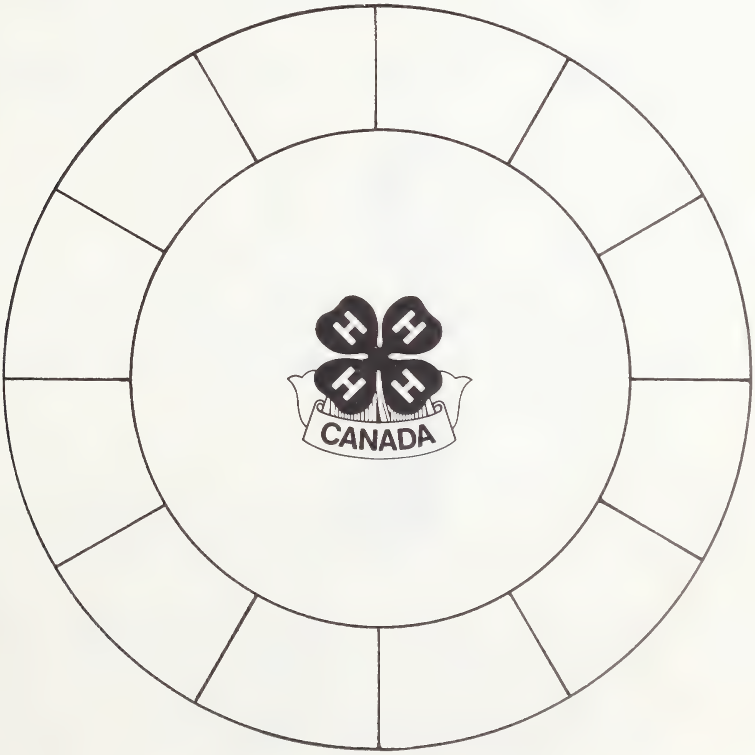
IDEAS TO BE LEARNED

1. Finger weaving
2. How to make a belt or necklace



THINGS TO DO

Let's see if you can remember the 12 basic colors on the color wheel. Remember that there are three primary colors. The primary colors are combined to form the secondary colors. Both the primary and secondary colors are combined to form the intermediate colors.



FINGER WEAVING

Finger weaving is a process in which you use your fingers to guide the weft (horizontal) threads through the warp (vertical) threads. Finger weaving is thought to be the oldest type of weaving there is. All you need is a stick and some yarn.

You learn how to make braids of finger weaving. These braids can be used for various things such as necklaces, belts, bracelets and sashes. It all depends on how long you want to make your band of weaving.

FINGER WEAVING BRAID

Materials You Need:

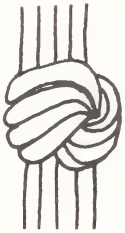
--a long pencil

--yarn in various lengths and colours.

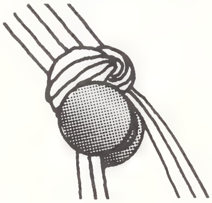
1. Cut the yarn three times longer than you want your finished project to be. For example, if you are making a 15-centimetre bookmark you cut your yarn into 45-centimetre lengths.

2. For a practice braid cut four different colors of yarn into 45-centimetre lengths.

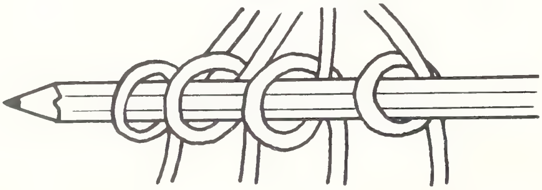
3. Take one end of each piece of yarn, and tie them all together into one big knot at the end.



4. Anchor the knotted end of the yarn to a sturdy object such as a door knob, chair back, drawer handle, or pin it firmly to a cork board or macrame board.

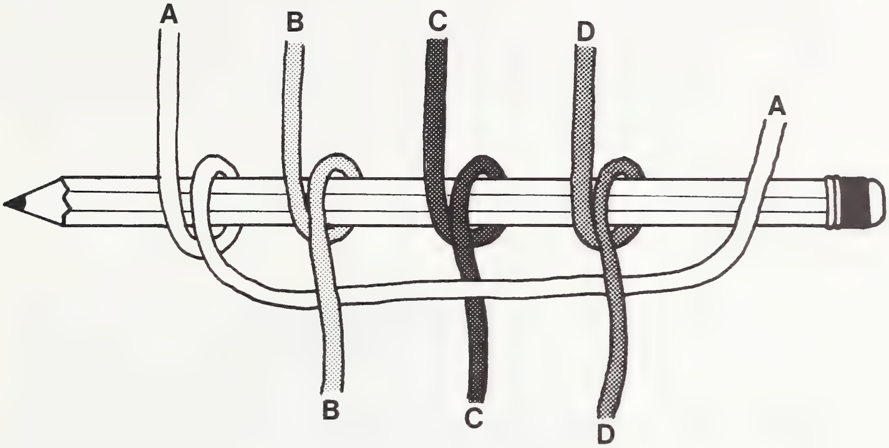


5. Wind each strand of wool around the pencil about five centimetres below the knot.



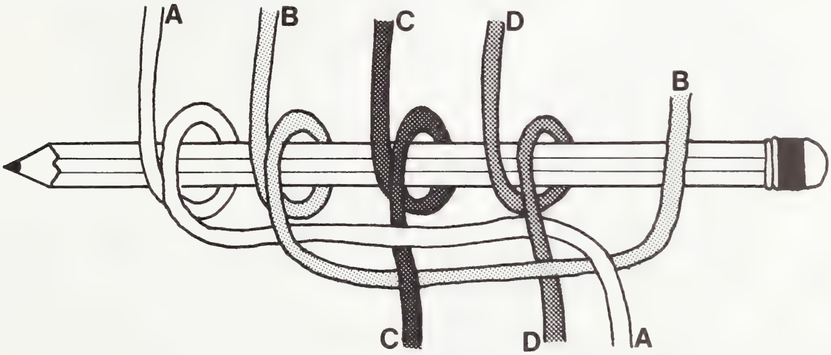
6. Hold the loose ends of the wool (about 10 centimetres below the pencil) towards you. Hold them with your right hand and pull until they are fairly tight.

7. Work from the left to the right. Pick up strand A and weave it under strand B, over strand C, under strand D and so on under and over all strands.



8. Pull strand A parallel to the pencil and with the fingers of your left hand, push it up close to the pencil. Then take the loose end of strand A over the right end of the pencil.

9. Pick up strand B and weave it under strand C, over strand D and so on under and over all strands. Pull strand B parallel to the pencil and push it towards the pencil.



10. Continue weaving each end from the left hand side, being sure to reverse the previous row's sequence of under's and over's. Make sure you are not getting the ends of your strands into one big tangled knot. Keep them neat!

NOTE: To keep your band from curving right or left pull your warp strands straight each time you weave a weft strand.

11. To finish off your project you can make a fringe or a hem.

Fringe: Take two strands and tie a knot. Do the same with all strands along the bottom of the braid. Trim ends so that they are all even. Cut the knot off the top of your braid and finish it the same way as the bottom.

Hem: Tie off strands with a knot, then trim close to the knots. Turn the knotted ends in towards the wrong side about five millimetres, then fold again about two centimetres from the edge. Neatly stitch the hem using a similar color of thread.

MORE THINGS TO DO

A SMALL PROJECT

After you have completed your practice braid you probably want to work on an actual project. You may want to make a sash, a necklace, a bookmark, a belt, or anything else you can think of.

You probably want to make your braid a lot wider than we did in the practice session. Some braids have as many as 40 different strands on them. It really depends on how wide you want your braid to be, and how thick your wool is.

Different combinations of yarn colors give different patterns in your braid. Below we list three different color combinations you may wish to try, but be sure to experiment with your own combinations. Record these combinations in your Project Book along with the kind of pattern they make.

Combination 1

eight strands light blue; eight strands medium blue; eight strands navy

Combination 2

five strands pink; five strands blue; five strands yellow; five strands green

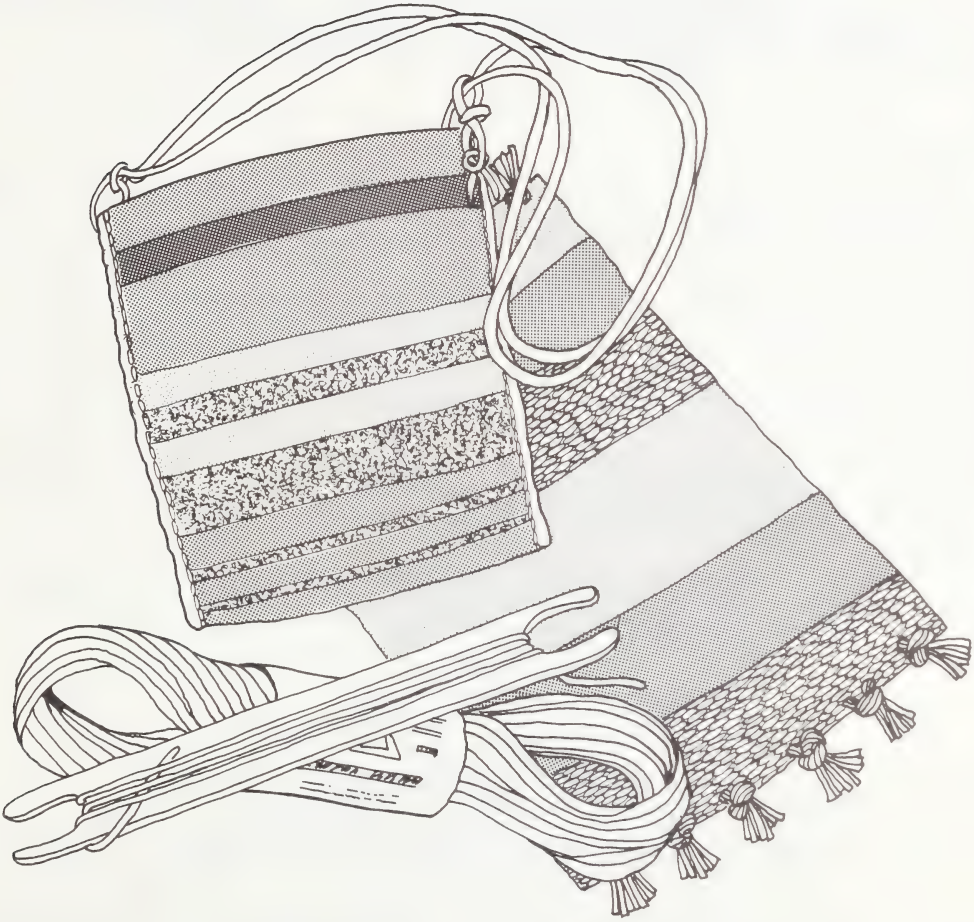
Combination 3

three strands yellow, three strands white; three strands blue; three strands white; three strands yellow

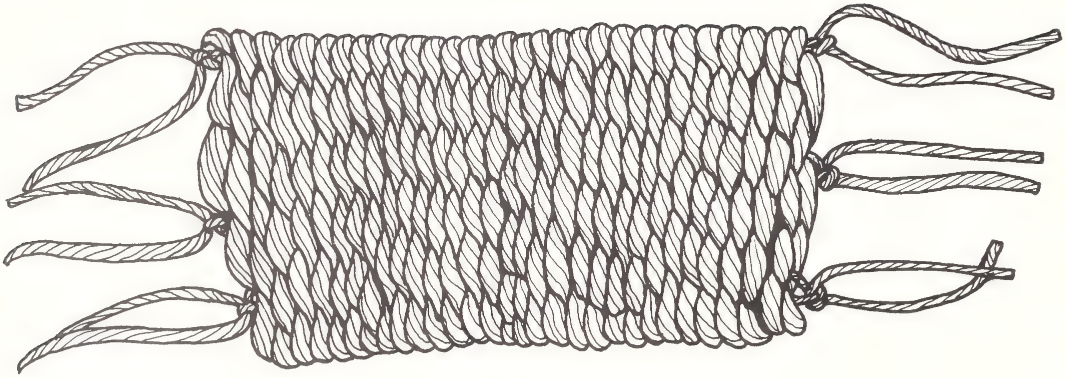
Work on your project at home and bring it with you for your next club meeting.

MATERIALS TO BRING FOR THE NEXT MEETING

- weaving kit
- a piece of medium weight cardboard (from the back of a writing pad or from a cereal box)
- cotton yarn (at least three metres)
- scraps of cotton and wool yarn.



WOVEN BOOKMARK



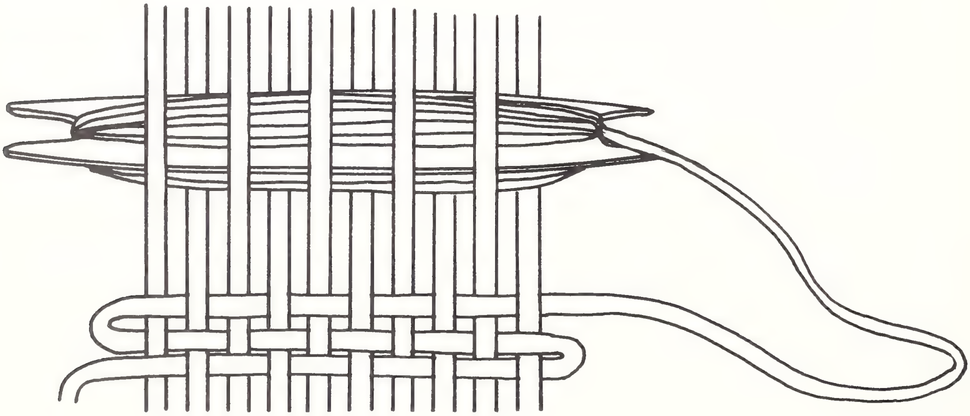
Materials You Need:

- -lightweight cotton rug yarn for warp, 165 centimetres
- -lightweight cotton rug yarn for weft, three metres
- -a piece of cardboard 6.75 centimetres by 30 centimetres for frame
- -a piece of cardboard 2.5 centimetres by 10 centimetres for shuttle
- -your weaving kit

WHAT IS A SHUTTLE?

Anything used to carry the weft (horizontal) threads over and under the warp (vertical) threads is called a shuttle. A shuttle can be made of wood, cardboard, or a needle, or you can also use your fingers.

It is easier to use a shuttle a little longer than the width of your warp so you can slide it through the warp threads in one quick pick. A pick is one weft thread woven across all the warp threads.

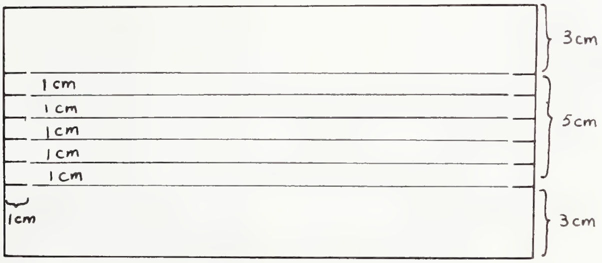


MAKING A CARDBOARD SHUTTLE

1. Cut a piece of cardboard 2.5 centimetres wide by 10 centimetres long.
2. Cut a notch in each end of the shuttle with your scissors.
3. Wind about 1.25 metres of your weft thread around the shuttle.

Preparing the Cardboard Frame

1. Start with a piece of cardboard 6.75 centimetres wide and 30 centimetres long.
2. With your ruler, measure and mark two centimetres from the top and bottom edges of the cardboard. Draw lines connecting these marks.
3. Starting from the borders, measure and make six marks, one centimetre apart, on the top and bottom of the cardboard. Draw lines connecting these marks.

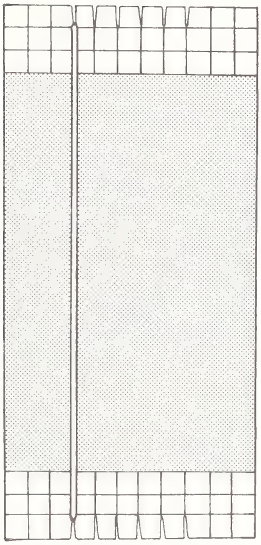


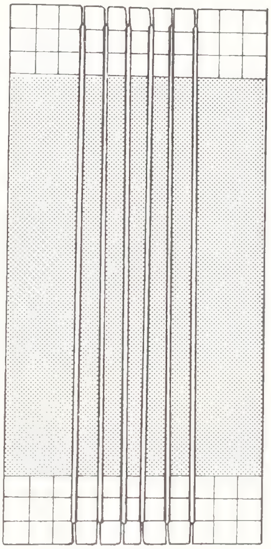
4. Cut six slits one centimetre deep on the top of the frame. Do the same on the bottom.

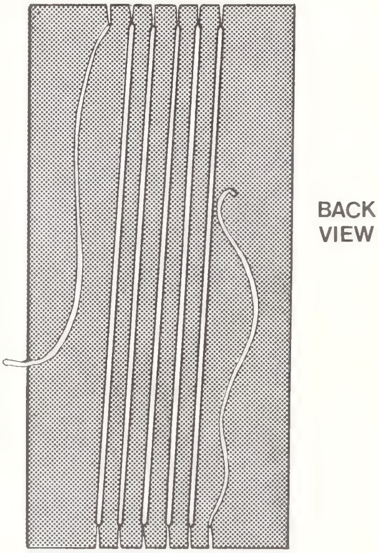
Stringing the Warp on the Frame

1. Pull the yarn through the first slit at the lower left corner of the frame. Leave a 15 centimetre tail in the back.
2. Bring the yarn up the front and through the first slit at the top left.

3. Carry the yarn down the back and through the second slit at the bottom.







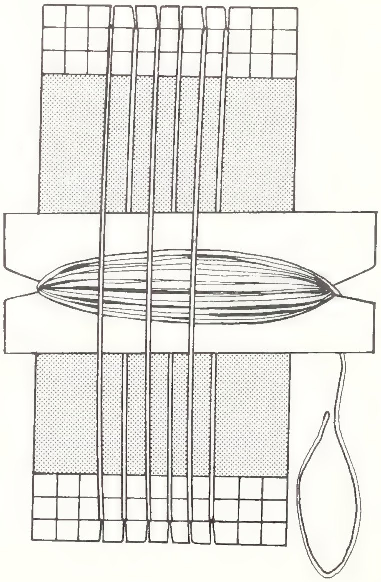
4. Continue wrapping the warp yarn around the cardboard frame until you have six warp threads on the front. Make sure that the thread is securely notched in each slit at the top and bottom. Stretch the yarn tightly so that it doesn't sag.

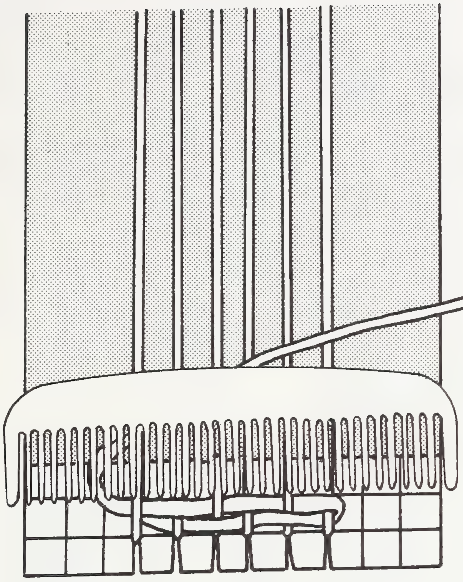
5. Cut the last warp thread, leaving a long tail.

Weaving the Bookmark

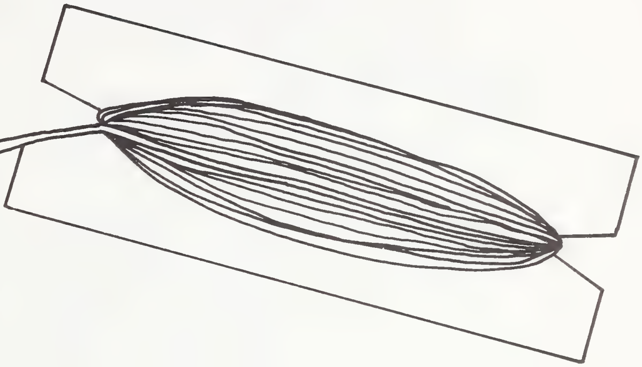
1. Starting at the right, insert the shuttle over and under the six warp threads as follows: over the first, under the second, over the third, under the fourth, over the fifth, under the sixth.

2. There will be a short "tail" of yarn at the right end of this row. Weave the tail into the warp as follows: under the first, over the second, under the third, over the fourth. This is the opposite of Step 1 and serves to anchor the yarn.

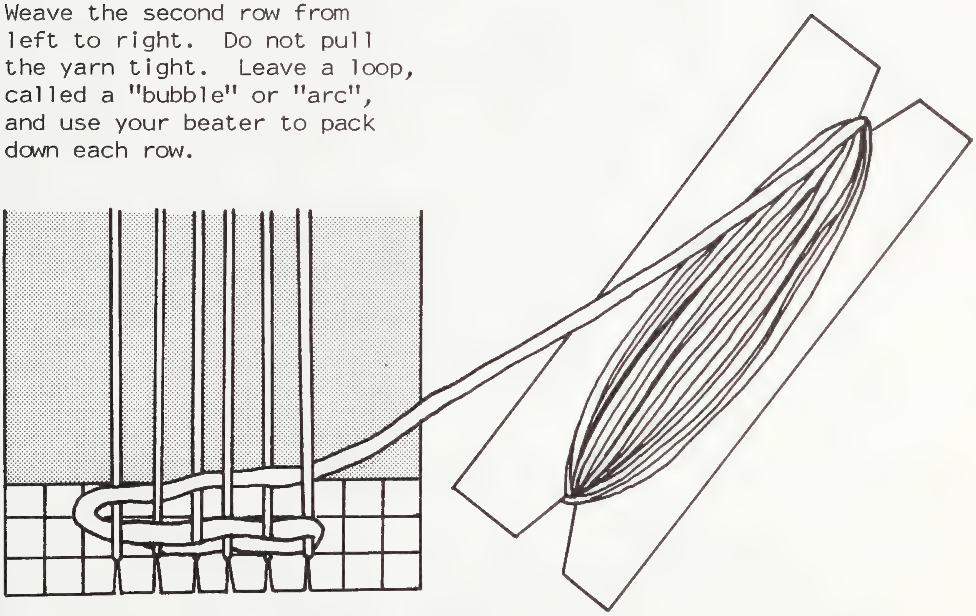




3. With a comb or other beater, pack or beat the tail close to the first row.



4. Weave the second row from left to right. Do not pull the yarn tight. Leave a loop, called a "bubble" or "arc", and use your beater to pack down each row.



5. Repeat Steps 1 and 4 until you have used all the yarn on your shuttle.

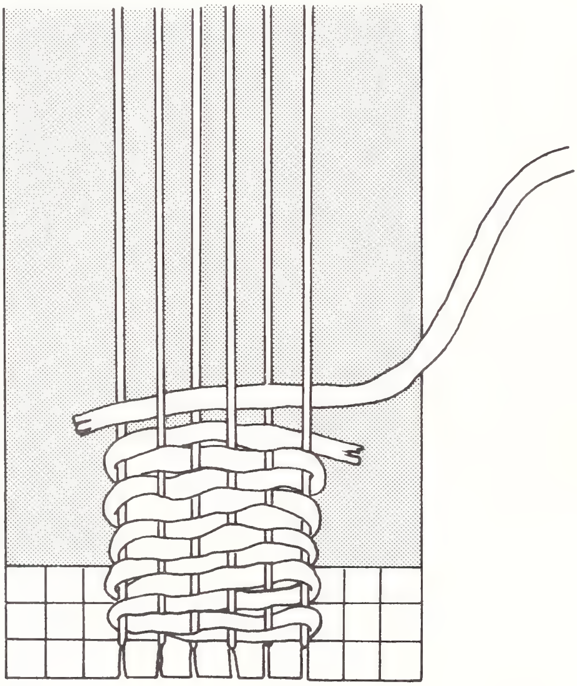
Be careful to keep the edges even and do not pull the yarn tight!

Laying in a New Weft Thread

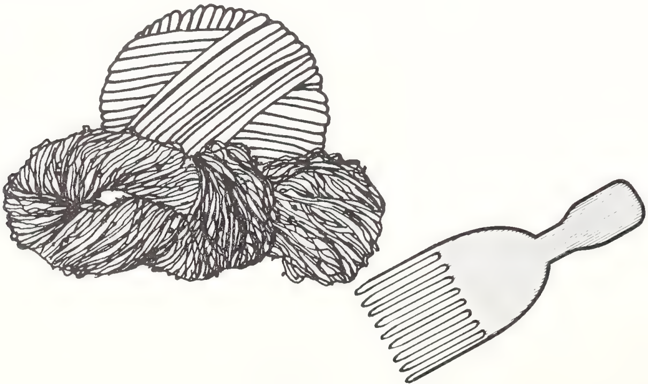
1. Wind another metre of yarn around your shuttle.

2. Follow exactly the same weaving pattern with the new weft thread as you just finished in the last row. Be sure it goes over and under the same warps as the last row. Beat this new row.

NOTE: You will have an extra piece of yarn sticking out from the bookmark. Don't knot it--leave it, and when you finish the bookmark, cut it close to the weaving.



3. Continue to weave as you did before until the shuttle will no longer pass over and under the warp. If you run out of yarn, lay in a new thread when you need it.

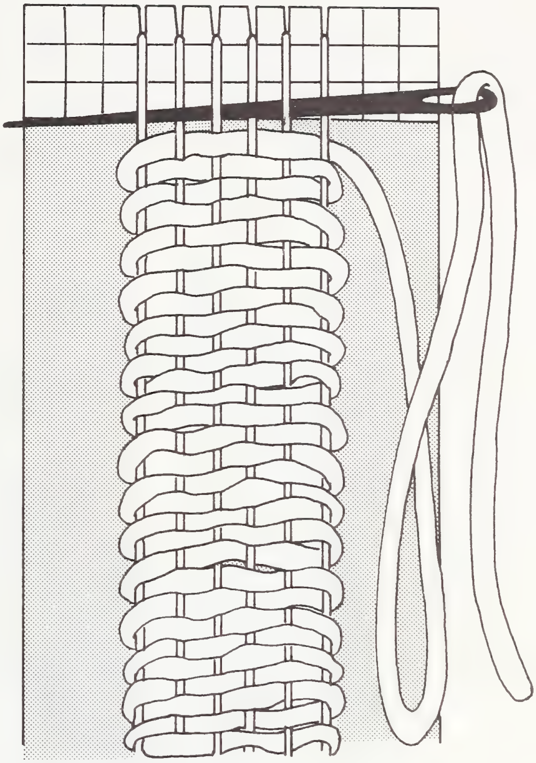


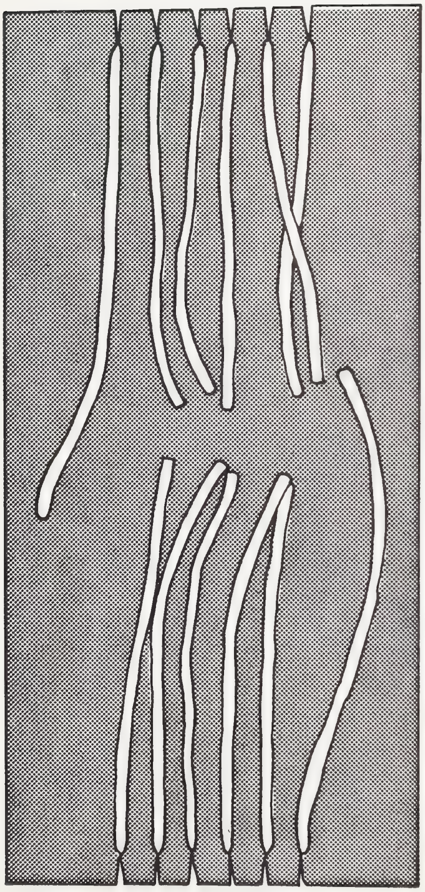
Finishing the Narrow Space

1. Remove the yarn from the shuttle and thread it in a needle. The needle is now your shuttle.

2. Weave tabby with the needle and yarn in the same way as you wove with the cardboard shuttle until you reach the top of the frame.

3. Weave the tail end back in the bookmark. Remove the needle. Do not cut the end yet.





Finishing the Bookmark

1. Turn the frame over and cut the five warp threads in the centre.

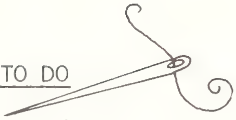
2. Remove the weaving from the frame.

3. Knot every two warp threads together at each end. The knots hold the weaving together.

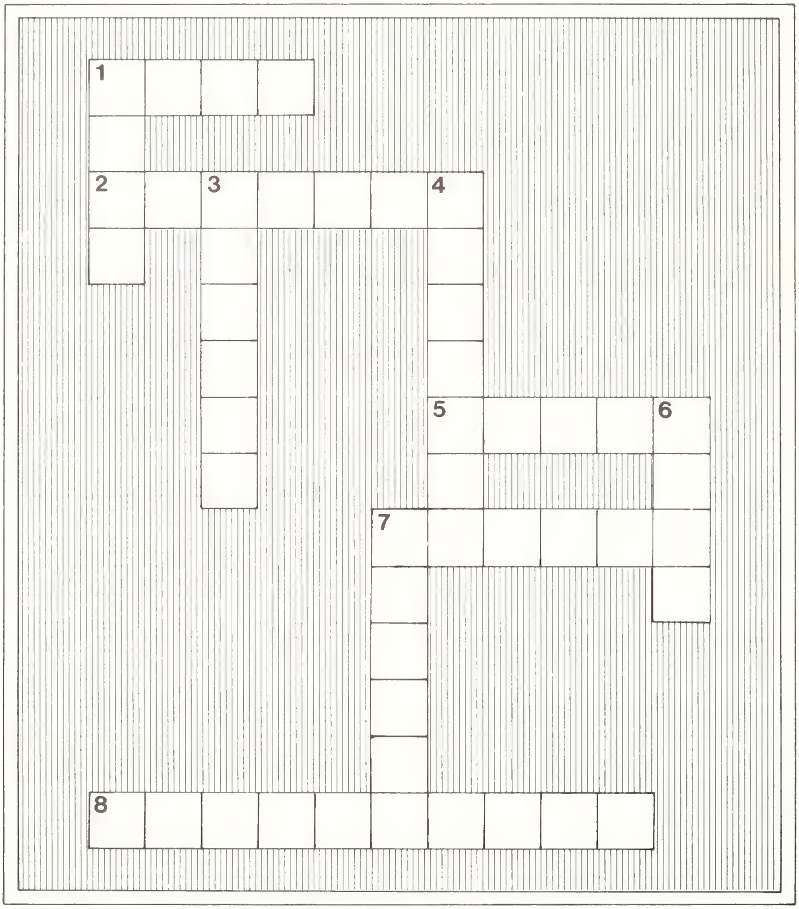
4. Cut any loose threads close to the weaving.

5. Press the bookmark if necessary.

THINGS TO DO



Do this word puzzle to review the weaving terms you have learned. Check your answers in the Answer Section.



DOWN

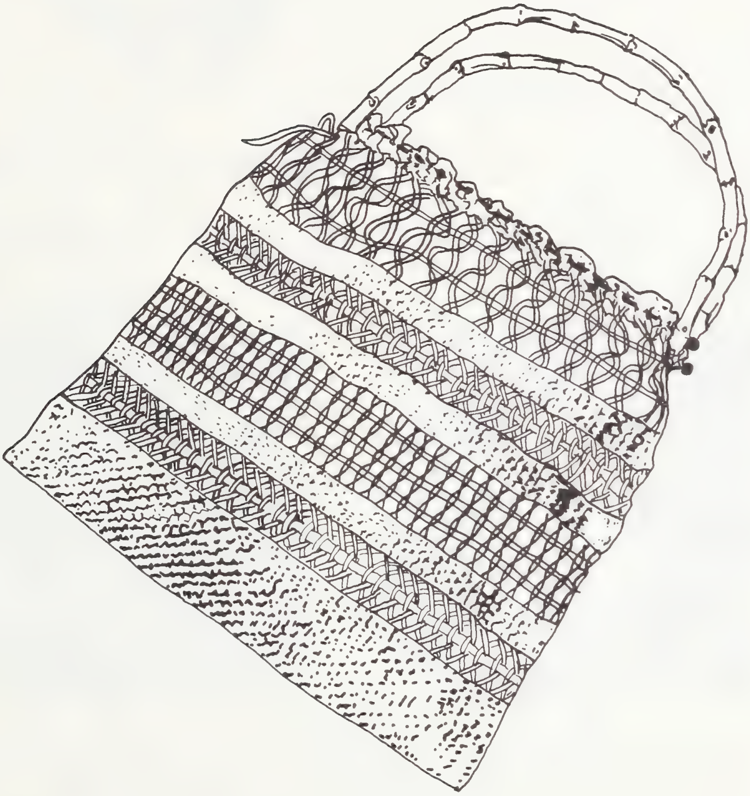
1. The horizontal threads in a weaving
3. A tool that can be used to carry horizontal threads (Hint: it has an eye)
4. A tool used to carry and hold weft threads
7. An arc of ________ should be left when a new row is woven in
6. Fibre used in weaving

ACROSS

1. The vertical threads in a weaving
2. The earliest tool used in primitive weaving
5. Another name for plain weave
7. A tool used to pack thread down tightly
8. An eye of God

MATERIALS TO BRING FOR NEXT MEETING

- weaving kit
- a piece of medium weight cardboard (from the back of a writing pad or from a cereal box)
- cotton yarn (at least 3 meters)
- scraps of cotton and wool



LESSON 5

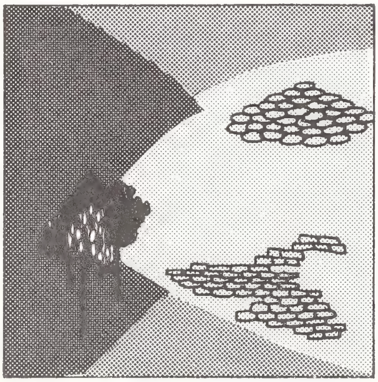
IDEAS TO BE LEARNED

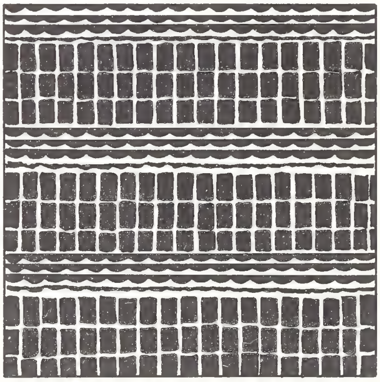
1. Elements of design--space and texture
2. Two different types of weaves

Turn to Design I and read about space and texture.

In weaving, open spaces in a design add to the overall effect just as much as closely woven spaces do.

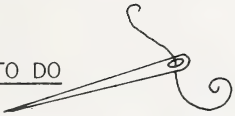
Compare these two wall hangings. The hanging on the left makes more use of open spaces than the hanging on the right.



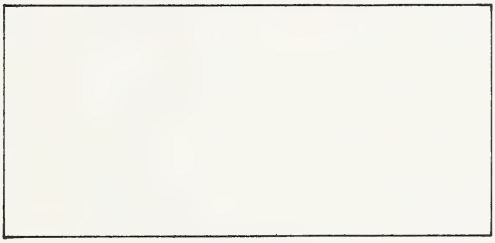


Texture is also an important part of any weaving. Fibres of different textures can be used to create special effects. If you were doing a wall hanging that had a spider's web design, for example, you might use a lightweight crochet cotton to create the filmy effect of the web. If your design suggested a tree, you would use a heavier yarn such as a rug yarn or unspun buffalo wool to create the effect of rough tree bark.

THINGS TO DO



1. Get together in your groups and try to come up with as many examples of different fibres as you can. Make a list for your brain-storming session in your Project Book.
2. Go down the list and describe the texture of each fibre.
   For example: mohair--soft and fluffy
   leather--smooth and flat
3. Divide these shapes in two completely different ways.
   a) create a design that makes use of a lot of open space.
   b) create a design that closes in the space.



OPEN SPACE

CLOSED SPACE

MAKING AND STRINGING A WEAVING FRAME

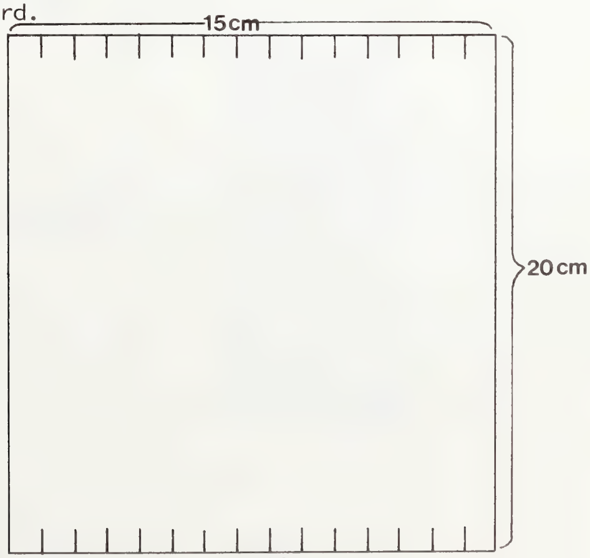
Before starting to learn about different weaving techniques, we must make a frame and string it. At this point we learn how to make a cardboard loom.

Materials You Need:

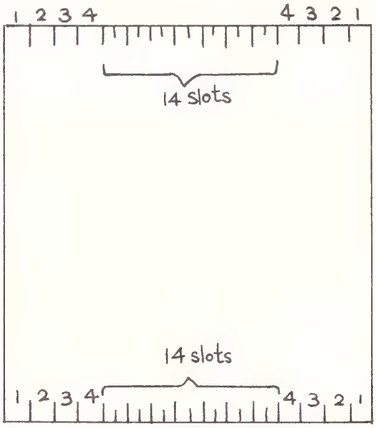
--a piece of cardboard (the kind you find on the back of writing pads, or on cereal boxes.)
--strong cotton warp yarn--three metres long
--scraps of cotton or wool yarn.

1. Cut the cardboard into a rectangle 15 centimetres by 20 centimetres.

2. Carefully measure off and mark 15 centimetres on the top and bottom of the cardboard.



3. Count in four centimetres from both the top and bottom and divide each of the middle seven centimetres in half.



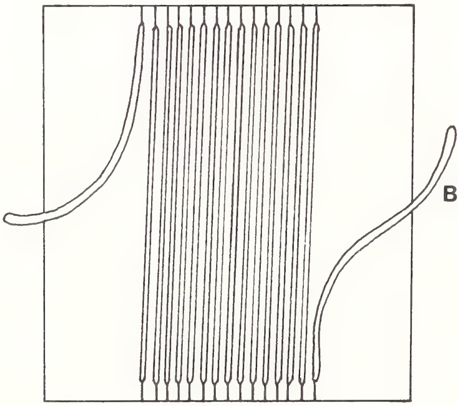
4. Cut small slots (five millimetres deep) into each of these middle 14 marks. Do the same on the top and the bottom.

5. Pull your warp yarn through the first slot in the lower left hand corner. You should leave a 15-centimetres tail dangling in the back.

6. Bring your warp yarn up the front of the cardboard and through the first slot in the left top corner. Carry the yarn across the back of the frame and pull it through the second left bottom slot.

7. Continue to wrap the warp yarn on the frame until you are finished all 14 slots. Cut the yarn, leaving a long tail.

NOTE: Be sure to pull your warp yarn tight, but not tight enough to make your cardboard frame buckle.


BACK VIEW

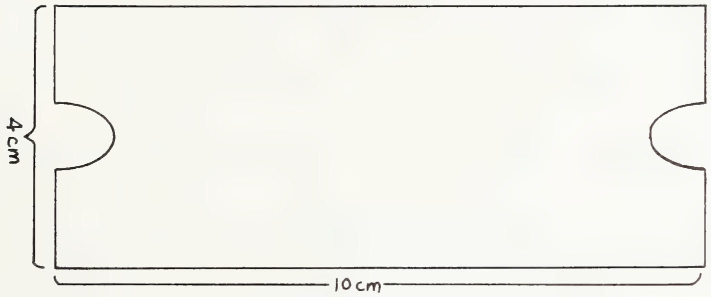
MAKING A SHUTTLE

Shuttles are used to carry weft (horizontal) yarns over and under the warp (vertical) yarns. When you made the braids, your fingers acted as shuttles. Now you learn how to make a shuttle out of cardboard.

1. Cut a rectangle of cardboard 10 centimetres by four centimetres.

2. Cut a notch into the short end on each side of the rectangle.

3. Fill the shuttle with about 1.5 metres weft yarn by winding it gently into the notches in your shuttle.



TWO NEW WEAVES

Materials You Need:

--a cardboard frame, strung with warp yarn.
--a shuttle filled with weft yarn
--a beating tool (comb, fork, etc.)

Tabby Weave

The tabby weave is the strongest and most common weave. It is the weave used in making your braids. However we will go over it again so you can become familiar with the use of a frame.

1. Starting at the left, insert the shuttle over the first thread, under the second, over the third and under the fourth, and so on until you have reached the end.

2. Pull the shuttle gently through the warp towards the right, leaving a short tail of yarn on the left.

3. Weave the tail end into the warp with your fingers, so that it goes under the first thread, over the second, under the third and over the fourth.

4. Start weaving the second row of weft from right to left. Weave over and under as you did in step one. When you pull the shuttle through the warp, do not pull too tight. You want to leave a very small loop of yarn on the right edge.

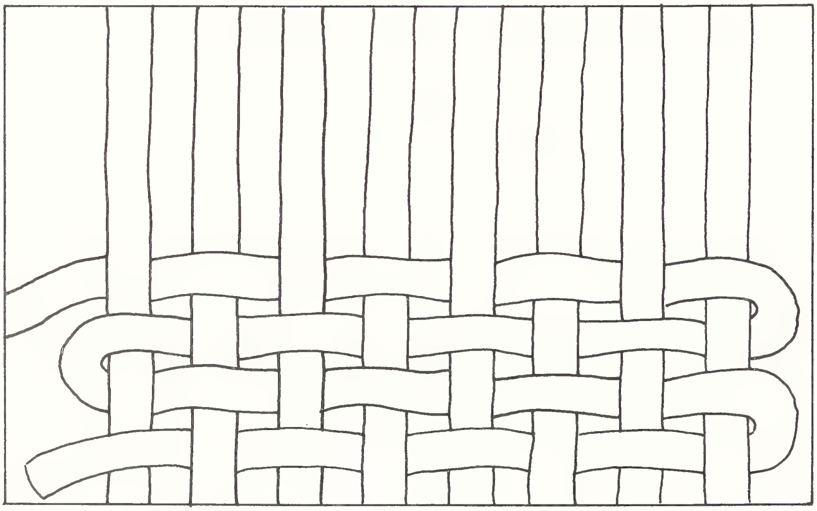
5. With your beating tool, pack or beat the second row of yarn close to the first.

6. Continue weaving until you run out of weft yarn. Be sure to beat each row as it is laid.

7. Wind another 1.5 metres of yarn on your shuttle. You may want to use a new color.

8. Lay in the second shuttle of yarn so that it goes over and under the same warps as the first end. Beat it in and continue to weave.

9. When you come to the end of your second shuttle of weft yarn, weave the tail end in with your fingers and beat it in tightly.

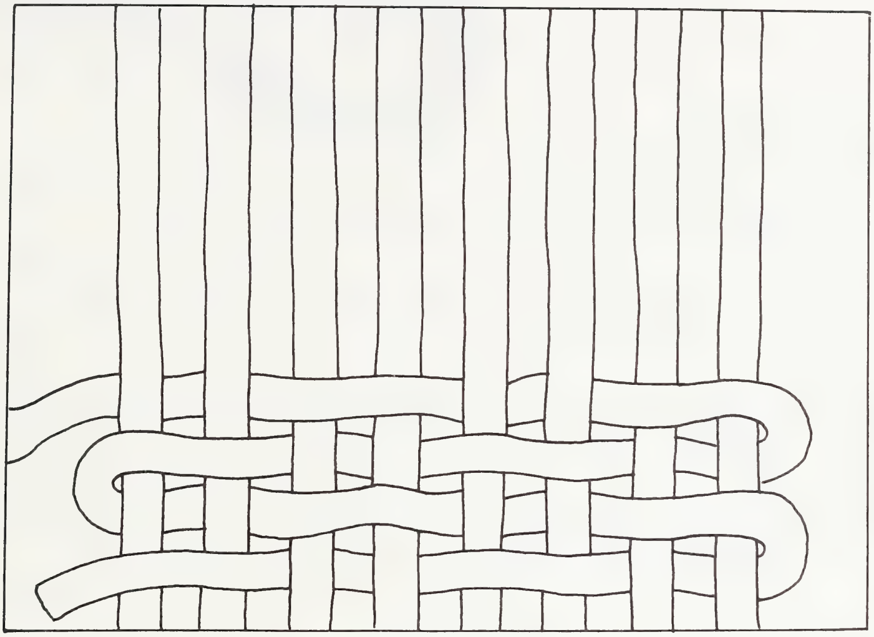


TABBY WEAVE

Basket Weave

The basket weave is almost the same as the tabby weave except you weave over two warp yarns, under two warp yarns, over two and so on until you reach the end.

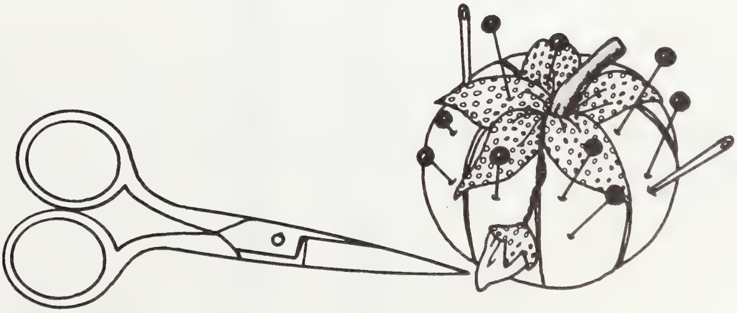
Be sure to weave the tail ends in and beat each row after you have finished weaving it.



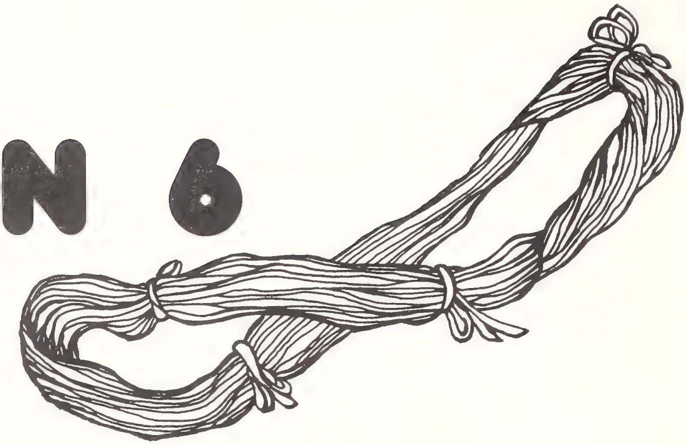
BASKET WEAVE

MATERIALS TO BRING FOR THE NEXT MEETING

- variety of colored yarns
- polyester fibrefill
- yarn needle



LESSON 6



IDEAS TO BE LEARNED

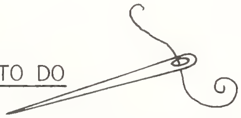
1. Elements of Design--structural and decorative design
2. A novelty knot or rya knot
3. Background information on your Achievement Day project

Turn to Elements of Design and read about structural and decorative design.

In weaving, structural design refers to the warp threads that create a skeleton or frame for the weaving.

Decorative design refers to whatever materials are woven into the warp to decorate the weaving. Decorative design is the pattern and colors you use and the different effects that yarns of various textures create.

THINGS TO DO



1. Start collecting things that you might work into future weaving projects. Keep all your "collectibles" in a plastic bag or box in your weaving kit so that you can find them easily.

   Pine cones, interesting tree twigs, unspun wool, interesting dried flowers, pieces of plastic or leather, and feathers all can be used--the list is limited only by your imagination!

2. Collect small scraps of fabric (from your mother's ragbag, or from the discount bin at a fabric store) and paste them into your Project Book. Write a sentence or two about the fabric design below the scrap. For example: Is the design printed onto the fabric, or is it woven into the fabric? Does texture add to the design of the fabric or is the fabric completely smooth?

RYA KNOT

Though the rya knot is not a type of weave, you may want to use it to add variety and texture to your work. Rya knots are traditionally used to make rya rugs and wall hangings--thick and bright works of art.

Cutting the Yarn

Here is an easy way to cut short even lengths of yarn.

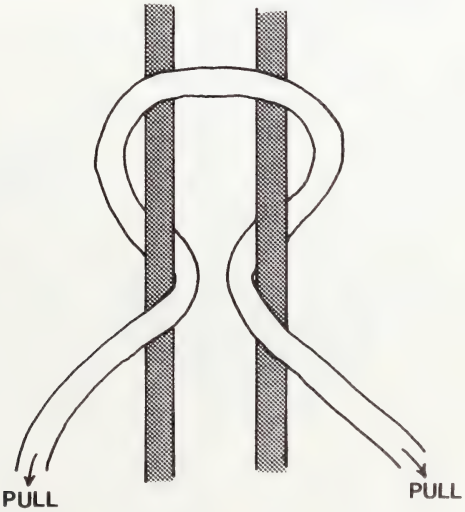
1. Cut a piece of cardboard into a rectangle six centimetres by 16 centimetres.
2. Wind a long length of yarn around the short end of the cardboard. If you want 10 strands of yarn, make 10 winds, if you want 30 strands of yarn make 30 winds.
3. Cut through the yarn at the lower side of the cardboard. You now have strands of yarn, each 12 centimetres long.

Rya Knots

1. Take one strand of yarn and place it over top of any two warp yarns.
2. Pull both ends of the strand of yarn over the side and up between the two warp yarns.
3. Pull the two ends of the yarn strand tight to make a knot.

You can now position the rya knot anywhere along the warp yarn.

Be sure to practice making rya knots until you can make them easily and quickly. Rya knots should be secured with at least one row of tabby before doing another row of rya knots.



ACHIEVEMENT DAY PROJECT

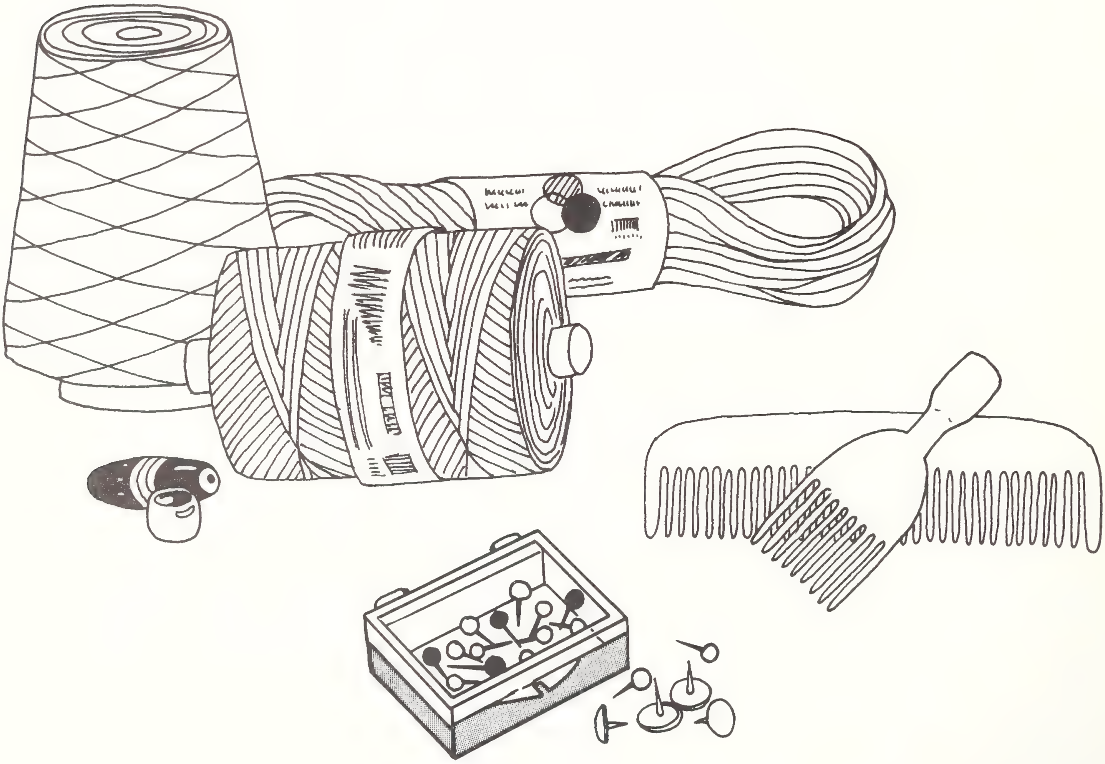
A wall hanging is a weaving project required for Achievement Day. Your project and project book will be on display at that time, so do the very best job you can. Note all the steps you go through when planning your wall hanging and keep a record in your Project Book.

For example, a sketch of your design and an example of the color scheme is helpful. You may want to include small snips of different materials you plan on using, and write a short paragraph about how you used the different elements of design in your project.

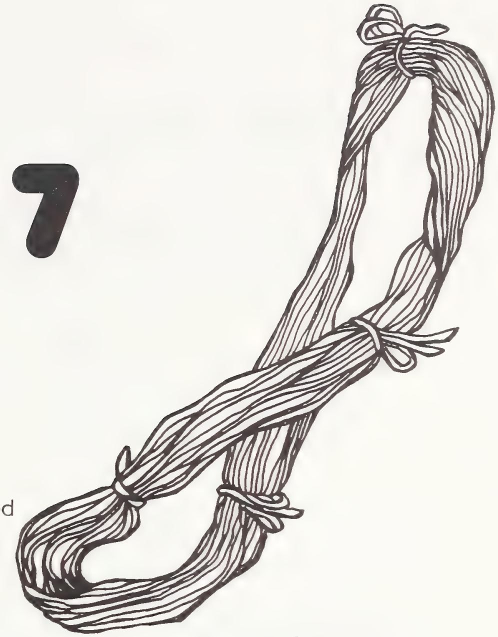
For more information on your Achievement Day project, refer to the next lesson.

MATERIALS TO BRING FOR THE NEXT MEETING

- four stretcher bars (you can buy these in most hobby stores)
- a package of small nails about 1.5 centimetres long with very small heads
- a hammer
- heavy cotton cord or yarn of your choice for stringing the warp

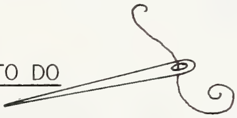


LESSON 7



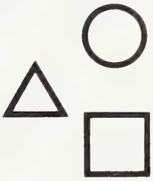
IDEAS TO BE LEARNED

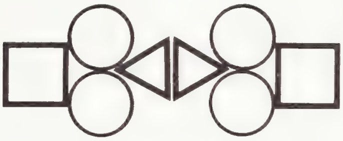
1. About the Achievement Day project
2. How to make a needle weaving loom
3. How to estimate how much yarn is needed



THINGS TO DO

Take three basic shapes and use them to create a pattern. Here is an example. Try making your own designs.





YOUR WALL HANGING FOR ACHIEVEMENT DAY

Remember when designing your wall hanging for Achievement Day that this is your project and you may do almost anything you wish.

You may use any of the techniques learned; tabby weave, basket weave, rya knots. Perhaps invent weaves of your own - the possibilities are endless. You can use different materials for your warp or weave the weft in your own way. You can use a tapestry needle as your shuttle, or make your own cardboard shuttle. Use your imagination--anything goes. Decorate your wall hanging with "collectibles" and be sure to use texture and color!

We show you how to make a needle weaving loom, but you can use a cardboard loom if you would rather.

THINGS TO WATCH FOR

1. Everyone weaves differently. There is no "right" way. Do the best you can, and try to make your weaving as uniform and even as possible.

2. When you are weaving, be sure to watch the sides of your project. It is easy to forget to loop the weft loosely at the sides and to start pulling the weft yarns tight. If you pull the weft yarns too tight, the side edges of your project curve inwards.

3. Do not load your shuttle with too much yarn. If your shuttle is too bulky it pulls your warp yarn out of place. Your filled shuttle should be able to pass between the warp yarns easily. The amount of yarn you can put on your shuttle depends on how thick and bulky your weft yarn is.

NEEDLE WEAVING LOOM

Materials You Need:

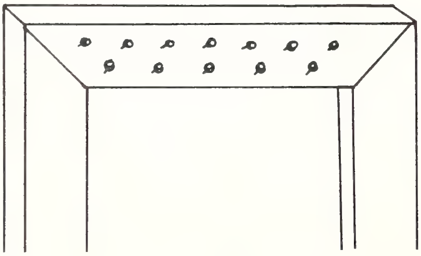
--four stretcher bars. Note: your loom can be made into any size desired. The stretcher bars come in many different lengths. If you want a square loom, choose stretcher bars all the same size. If you want a rectangle, you need two stretcher bars in one length and two stretcher bars in another length. Stretcher bars are available in most hobby and needle craft stores. Just follow the directions on the package for easy assembly
--a package of small nails about 1.5-centimetres long with very small heads
--a hammer
--heavy cotton cord, or yarn of your choice for stringing the warp

1. Slide the corners of the stretcher bars into each other, following the directions on the package. You may want to glue the stretcher bars together to make your loom really strong and inflexible.

2. Draw one line along the stretcher bar about a third of the way from the top. Draw a second line parallel to and one centimetre below the first line.

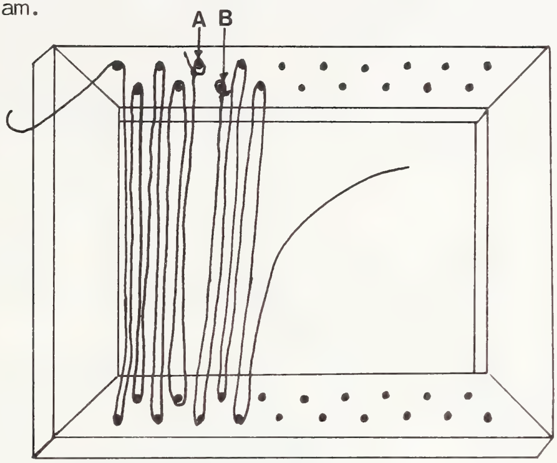
3. Hammer the nails along the top line, two centimetres apart. Do not hammer the nails all the way in, about five to seven millimetres should be sticking out of the bar.

4. Hammer another row of nails 2.5 centimetres apart on the bottom line See diagram.



5. Repeat steps 2 to 4 on the bottom bar of the loom.

6. Make a slip knot over the first nail with a warp yarn. Then string the warp yarn back and forth over the nails on the rest of the loom. See diagram.



7. To change colors, tie off old color on nail (A). On next nail (B) tie on new color and keep warping. Make sure you don't miss a nail.

ESTIMATING HOW MUCH YARN YOU NEED

Warp Yarn

1. Decide the outside dimensions of your project.

2. Look at your project design and decide how far apart each warp yarn should be.

   Example: My project is going to be 20 centimetres high and 20 centimetres wide so I will place warp threads five millimetres apart.

3. Get your pencil and do some calculations.

   Example: Since my project is 20 centimetres wide, I have two warp threads per centimetre. I therefore have 20 x 2 = 40 warp threads. Each warp thread is 20 centimetres long. I therefore need 40 warp threads x 20 centimetres = 800 centimetres or eight metres of warp thread.

4. Since this is only an estimate, be sure to get a little more yarn just in case! It is always better to have too much than not enough.

Weft Yarn

Estimating the amount of weft yarn you need is a little harder because you actually have to do some weaving.

1. Start by stringing a small amount of warp (about five centimetres wide should be enough).
2. Load your shuttle with two metres of weft yarn.
3. Weave a small square two centimetres by two centimetres.
4. Measure how much yarn is left on your shuttle.

Example: I started with two metres of weft yarn. After weaving a two-centimetres square, I have 1.5 metres left. I therefore used 200 centimetres - 150 centimetres = 50 centimetres of weft yarn.

5. Now, figure out how much yarn you used for one square centimetre of weaving. Since you wove a square, two centimetres x two centimetres = 4 square centimetres, all you have to do is divide the amount of yarn you used by four.

   Example: 50 centimetres of weft yarn was needed for four square centimetres of weaving. 50 centimetres: 4 = 12.5 centimetres of yarn are needed for weaving one square centimetre.

6. Next, figure out how many square centimetres of weaving to be done in your project.

   Example: My project is 20 centimetres high by 20 centimetres wide. It is 20 centimetres x 20 centimetres = 400 square centimetres.

7. Multiply the number of square centimetres in your project by the number of centimetres of yarn you needed to do one square centimetre of weaving.

   Example: 12.5 centimetres x 400 square centimetres = 5,000 centimetres of weft yarn or 50 metres of weft yarn

8. Once again, remember this is only an estimate. Be prepared by having a little more yarn so you won't run out if everything does not go as planned.

THINGS TO DO AT HOME

Work out your design and plan for your Achievement Day project before the next meeting.

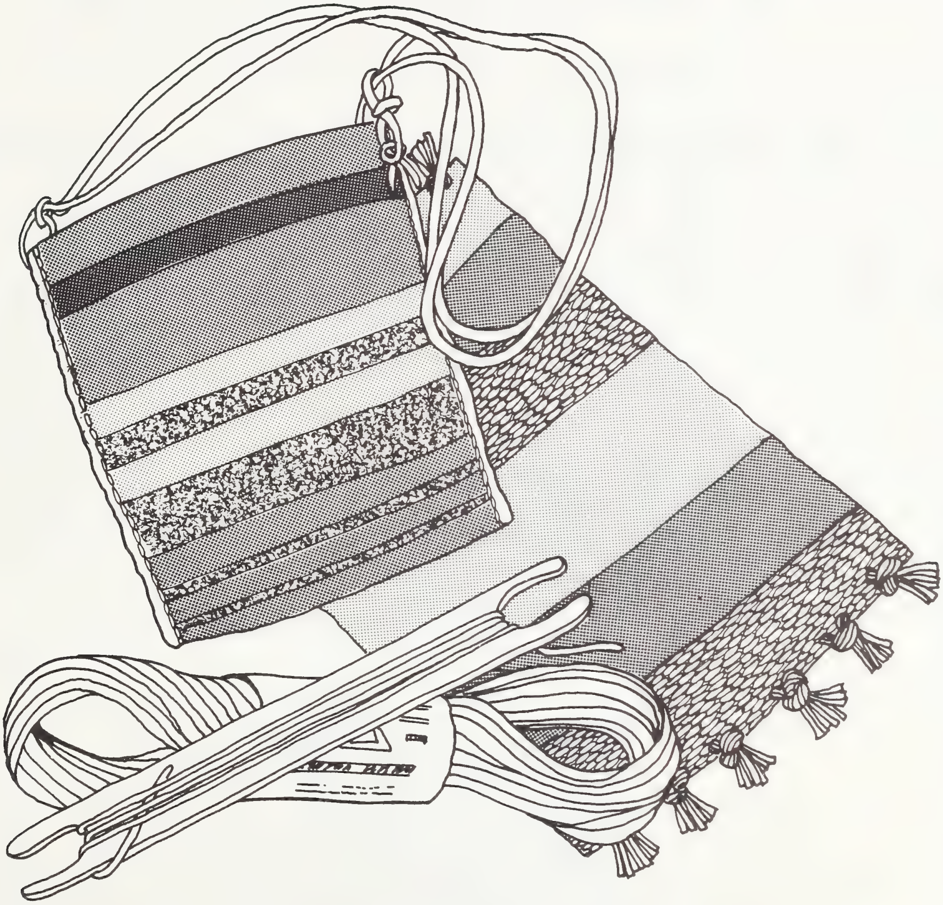
- decide the size of your wall hanging
- work out a design on paper
- decide what colors to use
- decide what textures of yarn to use
- decide what kind of weaving frame to use, stretcher bars or cardboard?

Draw your design on paper and color it in with colored pencils.

Bring your design, yarn samples and yarn estimates to the next meeting. Don't start the project until you have discussed your design with your group leader.

MATERIALS TO BRING FOR THE NEXT MEETING

- weaving kit
- Achievement Day design
- yarn samples
- yarn estimates

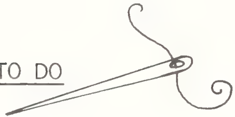


LESSON 8

IDEAS TO BE LEARNED

1. All the steps needed to complete an Achievement Day project.

THINGS TO DO



Find the following words in the puzzle and circle them. Look for the words both horizontally and vertically. Check your answers in the Answer Section.

1. warp
2. weft
3. beater
4. shuttle
5. yarn
6. web
7. frame
8. color
9. texture
10. space
11. shape
12. line
13. structural
14. decorative
15. arc
16. tabby
17. twill
18. basket weave

P	O	I	C	S	R	T	W	I	L	L	B	S
R	D	W	L	T	Z	D	Q	V	I	T	C	H
B	E	A	T	R	B	W	N	R	X	I	O	U
C	C	A	W	U	E	E	M	K	A	B	E	T
O	O	M	I	C	A	D	Y	V	K	O	K	T
L	R	E	L	T	T	A	B	B	Y	Y	S	L
O	A	M	T	U	E	T	A	S	H	A	P	E
R	T	S	W	R	R	D	S	O	P	R	A	Q
L	I	N	E	A	R	C	K	T	I	N	C	P
O	V	R	S	L	P	T	E	E	K	B	E	U
W	E	F	T	G	O	I	T	X	O	L	U	B
A	J	G	R	X	D	T	W	T	U	S	X	A
R	T	W	X	Q	H	I	E	U	R	V	C	A
P	Y	N	C	W	Z	U	A	R	P	Y	Q	M
F	R	A	M	E	K	I	V	E	W	N	Z	A
Y	J	D	T	B	T	H	E	I	L	O	P	E

ACHIEVEMENT DAY PROJECT

1. Before you actually start weaving your wall hanging, show your design, yarn samples and yarn estimates to your group leader.

2. If your group leader suggests any changes in your design plan, make them before you go ahead.

3. Put together your weaving frame and string the warp.

4. Weave in the weft, following your design plan. Be sure to beat in each weft yarn after you weave it.

5. Finish off all stray ends by finger weaving them. You may add a small dab of glue to make sure they are secure.

6. Attach your collectibles during your weaving or after you have finished.

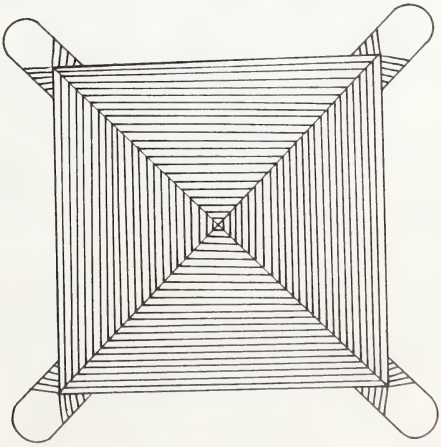
7. After you finish all weaving, you may hammer in the nails on your needle loom. You do not have to do this step. Many weavers like to leave the nails showing.

Though there are only a few steps listed above, each step takes a lot of time. Remember that your wall hanging should be finished before Achievement Day. Leave yourself lots of time to finish each step. Be creative and most of all, have fun!

WEAVING IDEAS

When you have finished your Achievement Day project you may wish to design more things for yourself or as gifts for friends. You may want to go to your local library and borrow some craft books, or if your mother or friends have craft magazines, browse through some of them for ideas.

You learned some useful weaving skills. It is now up to you to continue learning!



EXTRA PROJECTS

If you have finished your Achievement Day projects, here is one idea you can work on. This pin cushion would make a nice gift for your mother or aunt.

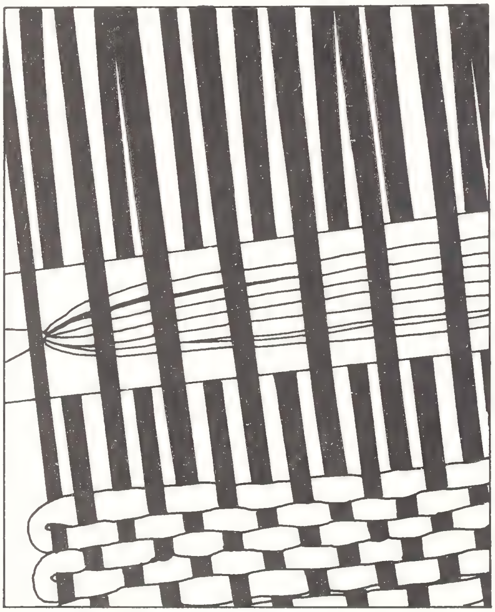
PIN CUSHION

Materials You Need:

--various colored yarns
--polyester fibrefill
--yarn needle

1. Cut a piece of corrugated cardboard 20 x 28 centimetres.

2. Wrap your loom with the yarn. Change colors if you desire.



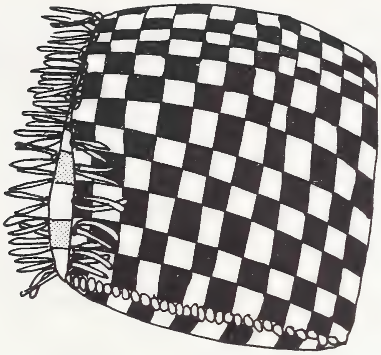
3. Wind yarn on your shuttle but don't fill the shuttle too full. You may want to make a longer shuttle for this project.

4. Weave tabby over, under, over, under. For more variety to your design, change colors in the weft.

5. After weaving all the possible space from your loom, cut and knot the ends.

6. Fold your weaving in half.

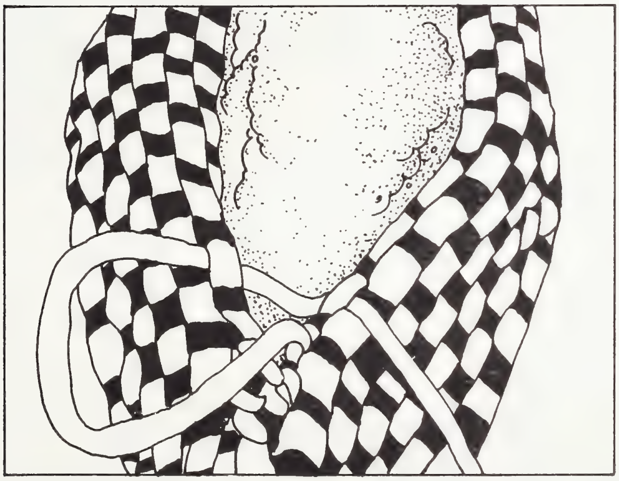
7. Thread the yarn needle with matching yarn and sew three sides together.



8. Turn inside out.

9. Stuff your pincushion with polyester fibrefill.

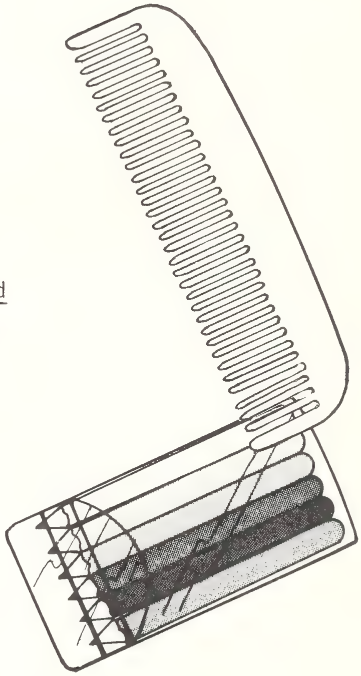
10. Sew the open end closed with small neat stitches.



ANSWER SECTION

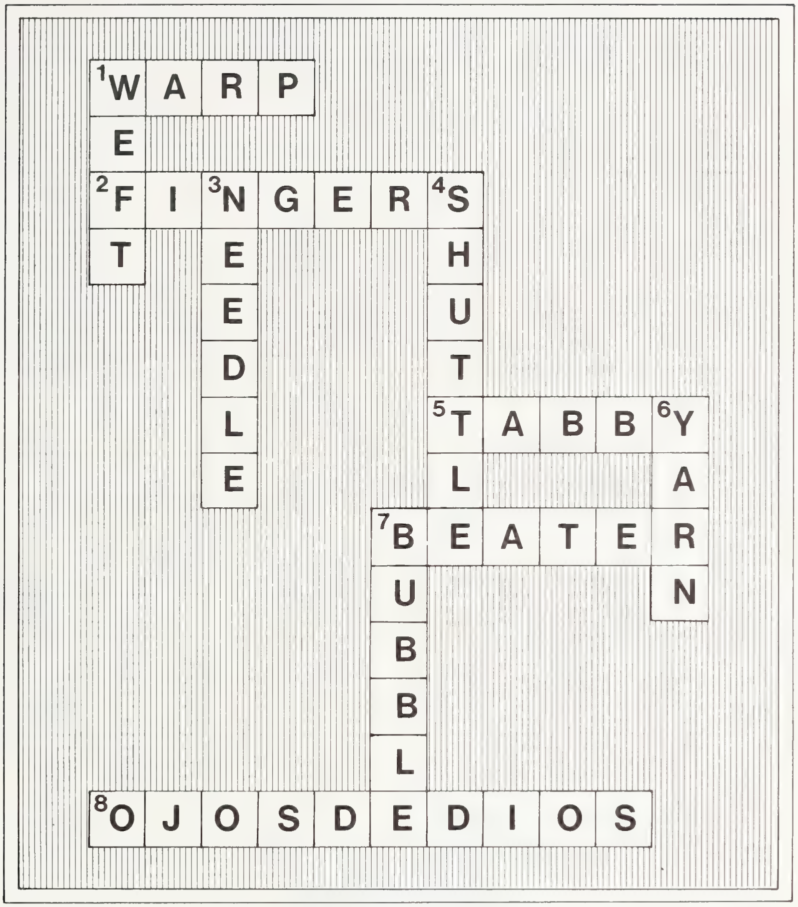
LESSON 1

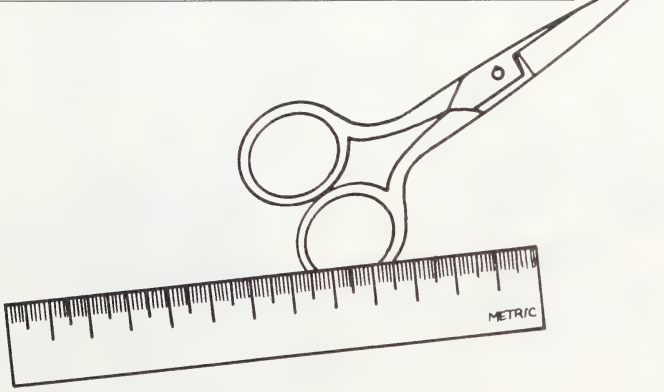
isrososcs	scissors
eparp	paper
cplnei	pencil
eugl	glue
urelr	ruler
aetbre	beater
sinp	pins
dbrrocada	cardboard
nyacosr	crayons



LESSON 3

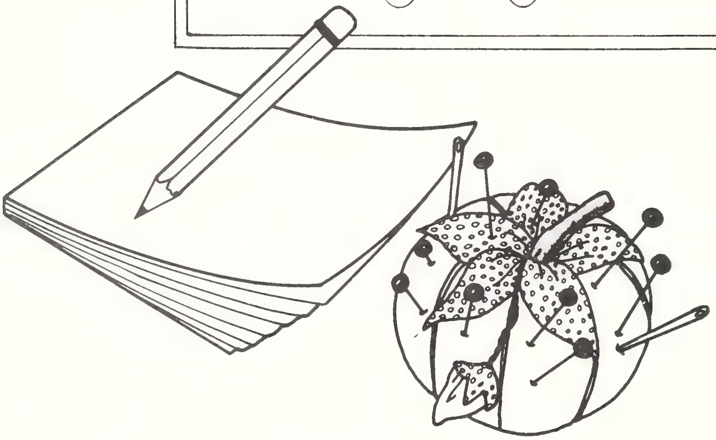
1. The three basic colors are red yellow blue
2. Red + Yellow = Orange
3. Yellow + Blue = Purple
4. Red + Blue = Purple
5. a. Red red/orange orange analagous
   b. Grey red black accented neutral
   c. Orange blue simple complement
   d. Red/purple yellow blue/purple split complement
   e. Red green blue orange double complement
   f. Purple green orange triad


1 WARP
WEFT
2 FINGERS
3 NEEDLE
4 SHUTTLE
5 TABBY
6 YARN
7 BEATER
BUBBL
8 OJOSDEDIOS


METRIC

LESSON 8

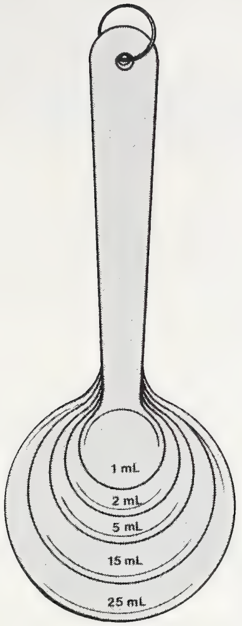
P	O	I	C	S	R	T	W	I	L	L	B	S
R	D	W	L	T	Z	D	Q	V	I	T	C	H
B	E	A	T	R	B	W	N	R	X	I	O	U
C	C	A	W	U	E	E	M	K	A	B	E	T
O	O	M	I	C	A	D	Y	V	K	O	K	T
L	R	E	I	T	T	A	B	B	Y	Y	S	L
O	A	M	T	U	E	T	A	S	H	A	P	E
R	T	S	W	R	R	D	S	O	P	R	A	Q
L	I	N	E	A	R	C	K	T	I	N	C	P
C	V	R	S	L	P	T	E	E	K	B	E	U
W	E	F	T	G	O	I	T	X	O	L	U	B
A	J	G	R	X	D	T	W	T	U	S	X	A
R	T	W	X	Q	H	I	E	U	R	B	C	A
P	Y	N	C	W	Z	U	A	R	P	Y	Q	M
F	R	A	M	E	K	I	V	E	W	N	Z	A
Y	J	D	T	B	T	H	E	I	L	O	P	E



METRIC CONVERSION TABLE

Approximate Conversion to
Metric Measures

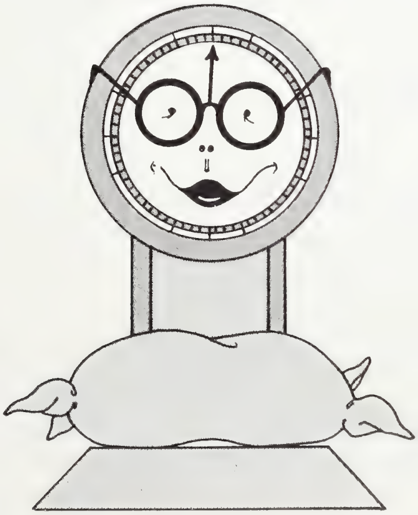
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL	BASE UNIT
			MASS (weight)		
oz.	ounces	28.349	grams	g	
lb.	pounds	0.454	kilograms	kg	
ton	short tons (2000 lbs)	0.907	tonnes	t	gram
g	grams	0.035	ounces	oz.	
t	tonnes (1000 kg)	1.102	short tons	ton	
			VOLUME		
tsp.	teaspoons	5	millilitres	mL	
tbsp	tablespoons	15	millilitres	mL	
fl.oz.	fluid ounces	28.413	millilitres	mL	
pt.	pints	0.568	litres	L	
qt.	quarts	1.137	litres	L	
gal.	gallons	4.546	litres	L	litres
bu.	bushels	36.370	litres	L	
mL	millilitres	0.035	fluid ounces	fl.oz.	
L	litres	1.760	pints	pt.	
L	litres	0.880	quarts	qt.	
L	litres	0.220	gallons	gal.	
L	litres	0.027	bushels	bu.	
			LENGTH		
in.	inches	2.540	centimetres	cm	
ft.	feet	0.305	metres	m	
yd.	yards	0.914	metres	m	
mi.	miles	1.609	kilometres	km	metre
mm	milimetres	0.0394	inches	in.	
cm	centimetres	0.394	inches	in.	
m	metres	3.281	feet	ft.	
m	metres	1.094	yards	yd.	
km	kilometres	0.621	miles	mi.	
			ENERGY		
kcal	kilocalorie	4.186	kilojoules	kJ	joule
kJ	kilojoules	0.239	kilocaleries	kcal	



METRIC MEASURES ARE
AVAILABLE IN THESE SIZES

250 mL replaces 1 cup
500 mL replaces 2 cups

MUNSTER METRE
MEASURES LENGTH



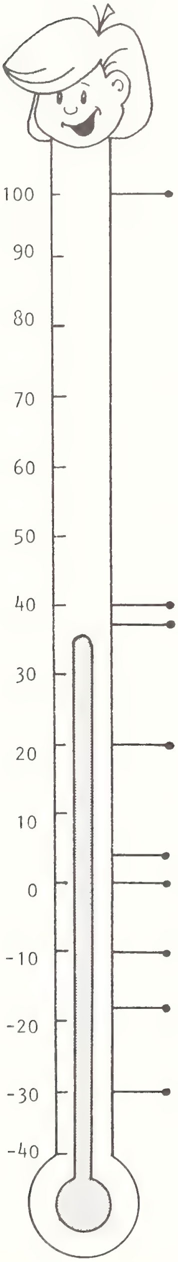
SAM KILOGRAM
MEASURES WEIGHT

LILY LITRE
MEASURES VOLUME

METRIC MULTIPLES AND PREFIXES TABLE

Multiplying Factor	Prefix	Symbol
1,000,000 = 10^6	mega (meg a)	M
1,000 = 10^3	kilo (kil o)	k
100 = 10^2	hecto (hek to)	h
10 = 10^1	deka (dek a)	da
(Base Unit) 1 = 10^0		
0.1 = 10^{-1}	deci (des i)	d
0.01 = 10^{-2}	centi (sen ti)	c
0.001 = 10^{-3}	milli (mil i)	m
0.000,001	micro (mi kro)	μ

(These prefixes may be applied to all metric base units.
Example: Base Unit = litre
Add kilo to litre (symbol kL) = kilolitre. The multiplying factor is 1000. This means a kilolitre equals 1000 litres.)


100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
WATER BOILS (100°C)
HEAT WAVE (40°C)
NORMAL BODY TEMPERATURE (37°C)
NORMAL ROOM TEMPERATURE (21°C)
REFRIGERATOR TEMPERATURE (4°C)
WATER FREEZES (0°C)
LET'S SKATE ON THE POND (-10°C)
FREEZER TEMPERATURE (-18°C)
POSSIBLE CAR BATTERY TROUBLE (-30°C)

TOM THERMOMETER MEASURES TEMPERATURE IN DEGREES CELSIUS (°C)

TEMPERATURE: °F = 9/5 + 32
°C = 5/9 - 32

OVEN TEMPERATURES:

	°C	°F
Very slow	120-135	250-275
Slow	150-165	300-325
Moderate	175-190	350-375
Hot	200-220	400-425
Very Hot	230-245	450-475
Near boil	245-290	475-500

ADDITIONAL METRIC INFORMATION

from:

Metric Branch
Alberta Government Services
12th Floor, Park Square
10001 Bellamy Hill
Edmonton, Alberta T5J 3C1

Metric Commission Canada
Box 4000
Ottawa, Ontario

Information Division
Canada Department of Agriculture
Ottawa, Ontario K1A 0C7

District Extension Office

OR

Publications Office
Alberta Agriculture
9718 - 107 Street
Edmonton, Alberta T5K 2C8

PROJECT EVALUATION

In order to keep meeting your needs in the 4-H program, we request your assistance in completing this evaluation form. Make your suggestions on this sheet as you use this book. After the project has been completed, mail this form to:

Project Evaluation
4-H Branch
Alberta Agriculture
9718 - 107 Street
Edmonton, Alberta
T5K 2C8

(use another page if required)

N.L.C. - B.N.C.
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